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"Neutral Point" in Plant Operation

Study of Cost Analyses to Determine When to Take Business and When to Let Some One Else Lose Money On It

BY H. P. PARROCK

A FOUNDRY operator, who has expressed interest in an article on foundry costs recently published,* has suggested further study of plant operation along lines which may be best defined by quoting a paragraph from his letter:

> The suggestion I have to make is one that is of vital interest to many manufacturers nowadays. Stated broadly, the metal forming business, either in foundries, forges or press shops, is suffering from excess capacity. Such shops as quote a price that might keep them out of red ink are running only partly full. Shops that quote a price to run them to capacity are losing money. It would be interesting to make a study to determine what I might call the "neutral point" for shop operation: meaning by that the point below which, if work were offered, the shop would lose less money by shutting down to a skeleton force than by taking the work and running full, and above which the shop would lose less money by taking the work and running full than by shutting down to a skeleton staff.

Without venturing a solution of this problem in the readers' case, or in any specific business or industry, because of lack of knowledge of local conditons, if for no other reason, we may discuss the question in a rather broad way in the hope of suggesting something of value.

Using the data of the gray iron foundry discussed recently in THE IRON AGE, two charts have been prepared. These show operating conditions at all daily outputs up to 100 per cent of rated capacity, and present graphically the results to be expected from the acceptance of low-priced tonnage business. As the figures used previously were presented in detail, only the necessary summaries are repeated here. The procedure consists in estimating costs at various outputs from 20 per cent of rated capacity to 100 per cent and plotting the results on an accurate drawing. Sales lines corresponding to various units, or per pound prices, show the total incomes.

Fixed Charges Analyzed

Table I shows the interest charges, the investment at "O" tonnage being obtained by extending the interest line. That is, at "O" tonnage we have the starting

*THE IRON AGE, Dec. 16 and 30, 1926. The author, both of that article and this, is a consulting foundry engineer, at 64 Francis Street, Brookline, Mass.

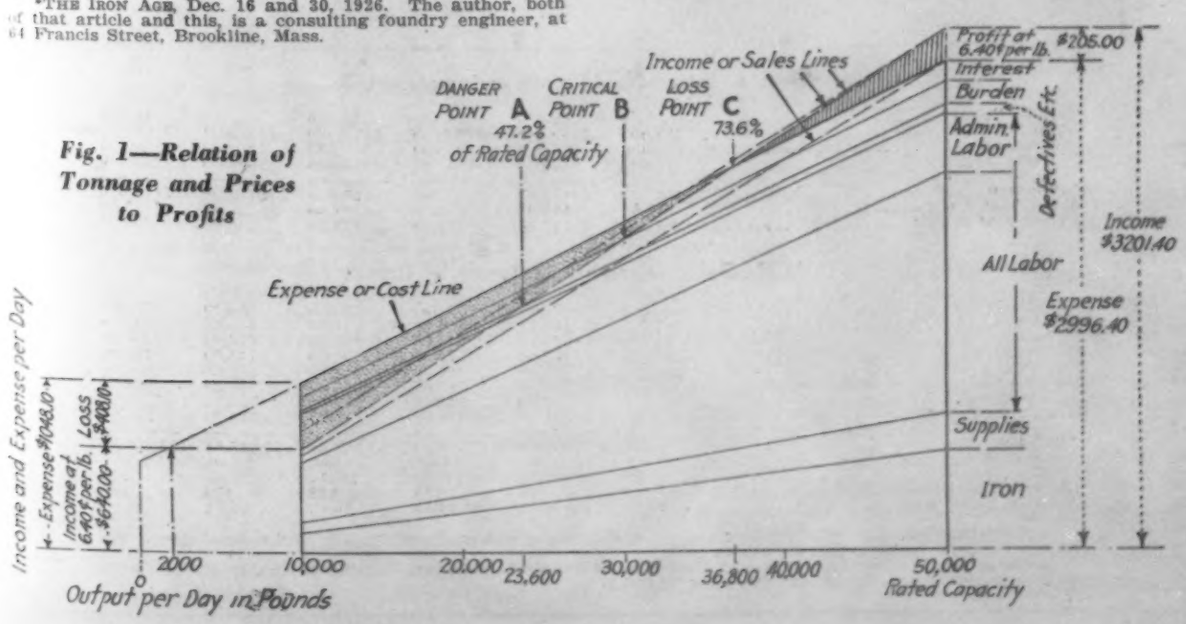


Fig. 1—Relation of Tonnage and Prices to Profits

charges, assuming that we are about to open the plant; or the minimum charges, which we approach when curtailing operations. All figures are reduced to a per-day basis, the year being taken as of 300 days. It should be remembered that this is a hopeful discussion of a method, rather than a precise accounting.

Table II is the daily payroll. In extending the labor lines to "O" tonnage, only the lines for molders and coremakers converge, it being assumed that production per molder-day remains constant, at 500 lb., and that one coremaker is required for every four molders. That is, this is a departmental or subsidiary shop, or one in which the class of work is fairly uniform, so that only the elements of varying tonnages and sale prices need be considered. Obvious disturbing factors interfere with this easy hypothesis: local conditions enter the problem.

Theoretically there should be no charge at "O" tonnage for some of the labor: but, aside from "lag" incidental to the attempt to eliminate all labor on idle days, there is the other condition of being ready to start the shop. Also, only the points for outputs beginning at 20 per cent rating are plotted. At very low tonnages some labor items become irreducible so long as the shop is operating, or "ready to start," and the labor line records this fact at "O" tonnage.

Table III is the estimated factory burden or overhead. These charges, extended to the "O" tonnage position, record a higher than actual expense for a shop which is shut down.

Table IV records all supplies including those for melting. Due to "lag" an appreciable amount appears at "O" tonnage.

Iron is priced at 1.25c. a lb. net in the castings. Selling expenses (not including labor) and defectives returned are included as one item in the summary, Table V. The melting expense is based on a 60 per cent yield of good castings.

Interest Charged Into Costs

The practice here of charging interest on invested money into the costs has been criticized as being a burden that most plants cannot assume; and also on the ground that stockholders' money is not strictly borrowed money, or bank loan. Accepting the investments in Table I as being correct under the conditions, it would be necessary to borrow money, we believe, before the capacity rating had been reached; or to have had an unusually heavy capitalization at the start of operations. It is probable that an interest charge in some amount would be assumed at some point in the expansion of the tonnage. Our flat rate of 6 per cent merely covers such contingency—perhaps in too generous terms. On the other hand there is no charge except this for depreciation on buildings and equipment, or for rent—management's use of stockholders' property.

As an operator, we would prefer to have adequate interest charges incorporated in the costs. This is partly because, having earned it, we would expect to participate in bonus earnings returnable above 73.6 per cent rated capacity on our chart; partly because of the incentive, the "bogey"; partly because we like an anchor to windward. These may not be basically good reasons to the accountant. But in so hazardous a business as founding, at least as we know it, an interest charge in the costs seems advisable. As part of a record which forms the basis for pricing, estimating new work, appraising new tonnage, it becomes a most important feature.

Diagram Shows Limiting Conditions

The cost items of Table V have been plotted on Fig. 1 in such manner that the effects of tonnage and prices may be seen at a glance. The total cost of the product at 100 per cent rated output (50,000 lb. a day) is $2,996.40, or 6.00c. a lb. The total cost at 10,000 lb. a day is $1,048.10, or 10.48c. a lb. At 2000 lb. a day it is $650, or 32.50c. a lb.

Three sales lines, or total income lines, are drawn on this chart: (a) The upper line shows sales at prices which return 10 per cent on invested capital at all tonnages, but based upon a cost figure of 6.40c. a lb. at all tonnages. (b) The middle line is drawn for sales at 6.40c. a lb., returning 10 per cent on invested capital at 100 per cent rated output only. (c) The lower line records sales made at 6c. a lb., or the cost at 100 per cent rated output.

In determining points *A*, *B* and *C*, the middle line or 6.40c. price is used. The upper line shows the advantage in sticking for a fair price on all work, but particularly on the light, difficult work that formed the basis of the previous discussion on this general subject. The Loss Point (as we term it) occurs where the 6.40c. sale line crosses the total cost line; the Critical Point where it crosses the interest line; the Danger Point where it crosses the factory burden line.

This chart evidently records an operation in which expense is immediately corrected to meet tonnage demands; that is, the cost line is a straight line, not a series of steps such as must prevail in actual practice. On the other hand, the chart records an ideal condition, assuming accuracy in the data, and one which means perfect control. Reducing the staff, on this chart,

Table I—Interest and Return on Investment

Output, lb.	0	10,000	20,000	30,000	40,000	50,000
Buildings	$250,000	$250,000	$250,000	$250,000	$250,000	$250,000
Equipment	125,000	125,000	125,000	125,000	125,000	125,000
Working capital	40,000	80,000	120,000	160,000	200,000	240,000
Investment	$415,000	$455,000	$495,000	$535,000	$575,000	$615,000
Interest at 6 per cent	$83.00	$91.00	$99.00	$107.00	$115.00	$123.00
10 per cent return	138.00	152.00	165.00	178.00	192.00	205.00

Table II—Daily Expense as Affected by Output

Output, lb.	0	10,000	20,000	30,000	40,000	50,000
Melters		$19.20	$24.00	$28.80	$33.60	$38.40
Molders		144.00	288.00	432.00	576.00	720.00
Coremakers		36.00	72.00	108.00	144.00	180.00
Cleaners		60.00	90.00	125.00	160.00	200.00
Helpers and common labor		101.60	162.00	213.60	264.20	324.40
Administrative B		94.00	105.75	117.50	129.25	136.00
Administrative A		199.50	208.75	218.00	228.50	240.00
All labor	$372.00	$654.30	$950.50	$1,242.90	$1,535.55	$1,838.50
Per pound		6.54c.	4.75c.	4.15c.	3.84c.	3.68c.
Employees	56	103½	153½	202½	252¾	303
Lb. per employee per day	0	96	130	148	158	165
Average daily wage	$6.64	$6.32	$6.13	$6.13	$6.07	$6.07

Administrative labor "B" includes: inspector, shipper, storekeeper, production clerks, timekeeper, carpenters, pattern makers, pattern clerks.

Administrative labor "A" includes: clerks, superintendent, foremen, master mechanic and helpers, watchmen, teamsters, salesman and executives (2).

means a corresponding decrease in tonnage and income. The chart represents, perhaps, the unattainable but desirable objective of executive effort. We think, however, that because of its "perfection" it will best serve as a basis for discussing the "neutral point."

Sales Lines at Varying Prices

On Fig. 2, to which the data of Fig. 1 have been transferred, four sales lines are shown, representing total incomes at prices of 6.40c., 6.25c., 6.15c., and 6.00c. a lb. The sales line at 10 per cent return on investment is omitted. Points *A*, *B* and *C* are shown, as before. One new feature is shown on this chart. At 100 per cent rated output (50,000 lb. a day) the ratio

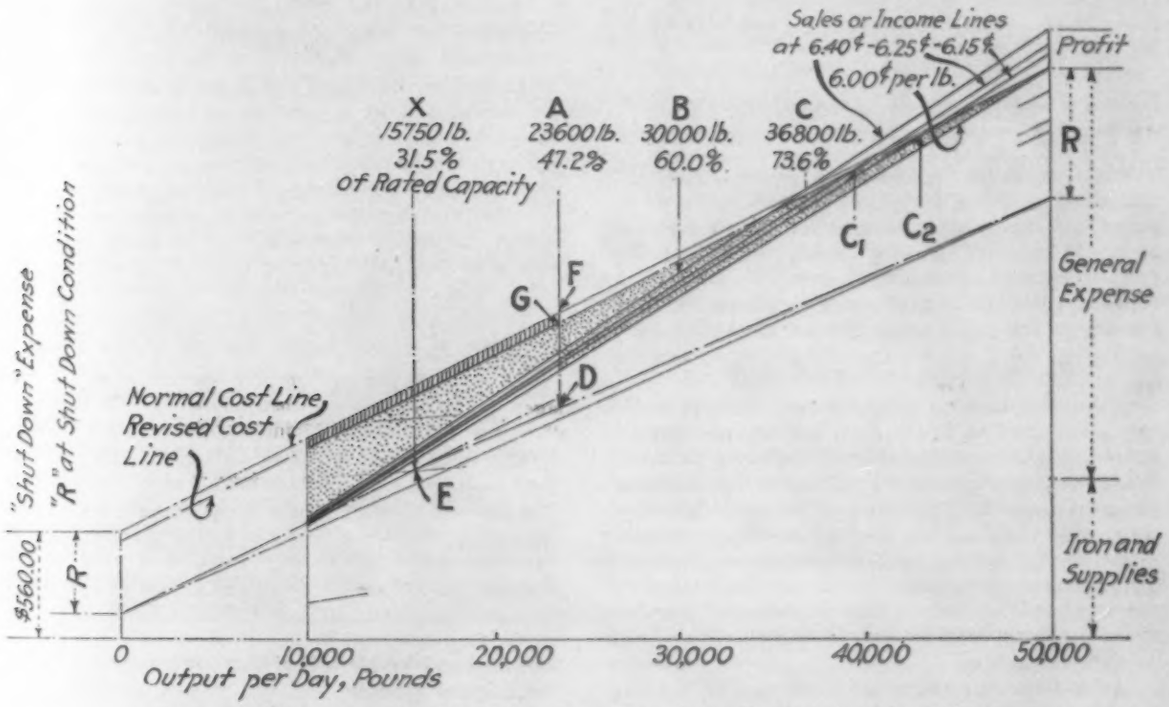


Fig. 2—Effect on Profits of Varying Unit Prices Received for Product

of *R* to "General Expense" is about 32/100. *R* is the sum of four items:

Interest	$123.00
Factory burden	143.00
Selling expense and defectives	50.00
Administrative labor A and B	376.00
	$692.00

"General Expense" is total cost less iron and supplies, or $2,155.40. At the point *A*, or Danger Point, this same ratio (scaled) is about 42/100. That is, where a point in production has been reached when action is imperative, the general effectiveness of the organization is about 75 per cent of what it is at 100 per cent rated output. Including interest, burden, selling expenses and defective charges in these figures does not materially alter the ratios, but an equivalent ratio may be found, omitting these items, if thought desirable.

On this chart, and in many plants, it is not possible so to correct the organization that it becomes as effective at 47.2 per cent of rated output as at 100 per cent rating, but we assume that some improvement is possible and have halved the desired gain under the point *A* in the upper part of the chart, designating this point *D*. The dash-dot line just above *D* shows the gain that would result if we could hold the 100 per cent rating effectiveness. What is the maximum tonnage which a "skeleton" organization can handle?

At "O" tonnage, "General Expense" reaches the minimum—a standby or ready-to-run grouping of the best labor the plant has developed. Expenses have been reduced to the lowest point, whether actually from experience or by careful study of the elements of cost from the "O" tonnage basis. The total cost at this point is the lowest; the organization the strongest. How much tonnage can be handled by this organization?

What Tonnage Can Be Handled?

We have drawn a line, from *R* expense at "O" tonnage parallel to the normal cost line, to indicate our opinion. The point *E*, where the line meets the new "effectiveness" line under *X*, marks the probable limiting tonnage. The gain made out of *R* expenses, in this way, is measured on the *A-D* line, transferred to the upper part of the chart under the cost line, (*F-G*) where it records a reduction in costs. This gain, amounting to about $50 per day, cannot be maintained under increasing tonnage conditions, but tapers off to zero at 100 per cent rating. That is, the organization reverts to its original 32/100 ratio at 100 per cent rating.

Below the *A* tonnage, the gain, perhaps modified after the period of stress, becomes permanent—a new condition of affairs is established. The reduction in costs of $50 is about 7¼ per cent of *R* expenses. Most of it must come from administrative labor *A* and *B*, some probably from economies in factory burden. Labor in this group must be reduced, preferably by elimination and by re-grouping of duties; possibly by change in pay. With this "skeleton" and effective organization in charge, the problem of heavy tonnage at low prices may be faced with confidence.

How Low-Priced Tonnage Works Out

The immediate effect of a drop in the average sale price, due to the acceptance of low-priced tonnage "to fill the plant," is shown by the increase in the loss between points *A* and *B*. An average sale price below 6c. would accentuate this feature, with the loss fully recoverable only at a tonnage above capacity rating. It is true that at high tonnages the shop begins to show a profit, but frequently the expected tonnage is never realized. The conditions of large tonnages and excess plant capacity are conflicting and contradictory. An ironclad selling agreement is unusual. A transaction may be made in all good faith but, where there is

high production capacity, a little falling off in general business conditions reacts in shortening of specifications and curtailment of tonnage.

The "gain" area to the right of point *A*, resulting from reducing the organization, is purposely left unshaded, to accentuate a decision which might be made at this tonnage—to proceed toward high tonnages at lower prices with the usual organization, or to "stand by" with the tonnage in hand, 47.2 per cent rating,

Table III—Varying Factory Burden With Increasing Output

Output, lb.	0	10,000	20,000	30,000	40,000	50,000
Taxes		$20.00	$20.00	$20.00	$20.00	$20.00
Insurance		5.00	5.00	5.00	5.00	5.00
Liability		15.00	20.00	25.00	30.00	35.00
Power, light		32.00	39.00	46.00	53.00	60.00
Heat		12.00	13.00	14.00	15.00	16.00
Water and sewers		3.00	4.00	5.00	6.00	7.00
Factory burden	$70.00	$87.00	$101.00	$115.00	$129.00	$143.00

with the operating force reduced as suggested. The immediate effect of low-priced tonnage, when a "go-ahead" decision is made, may be severe and should not be overlooked. An industry having "excess capacity" faces elimination of plants; we have known two to fail dismally when the owners rushed headlong into large tonnage at low prices in the hope of breaking even.

Operating Above Normal Capacity

Also, that foundry is of unusual character which can "hold" its cost figure when the tonnage begins to exceed its rated capacity, *unless* it improves its directly productive facilities—not a condition of this discussion. Frequently we find instances of sharply increasing costs, when molders are crowded too closely together in the hope of raising the tonnage figures. Reduction in costs comes from improvement in direct labor output first, and we believe that appraisal of new low-priced business demands careful examination of production possibilities.

An increase in molding speed—above 500 lb. a molder-day in this case—would obviously affect the chart and the problem. The high proportion of direct and semi-direct labor at the capacity tonnage indicates what generally happens when a plant is forced much above its rating—namely, that supervision becomes inadequate, direct labor production falls off, defectives increase, the anticipated gain disappears, and the chance of an even break, at least, at 100 per cent rating is lost. The shop condition is then that of boom times rather than of a depression; of high rather than low sale prices. The operation is forced, abnormal and sensitive.

Good Will Tonnage Must Be Guarded

Every shop of reasonably good history has a standing in the trade measurable in the tonnage that continues to come to it, even in times of severe depression. This tonnage represents practical good will, and an asset that must be guarded. New customers whose business may prove desirable in the long run are added to the list from time to time in the natural course of events—not in spasmodic increments.

Founding—not the manufacture of finished articles of which castings may be the basic element—is a firmly stabilized industry, essentially local in scope. Transportation has greatly facilitated distribution in the past few years, but its value seems to lie in permitting construction and operation of shops in outlying low-rent areas, rather than in widening markets. Iron castings, particularly, are sold close to the shop. Malleables reach a wider market, but new plants are rapidly limiting activities to a closer field. Brass of high quality is sold in rare instances a long way from home, but at a price not compatible with "tonnage" discussions.

Founding in the ordinary sense is an industry of immediate deliveries, of continually changing detail, of convenience and accessibility to the buyer. It has no "standard" product that can be made up in dull times, or seasons. Even a schedule of deliveries from its strongest customer may not be undertaken in advance without considerable risk, because of "change in design" or other probably good reason. Keenly competitive, local in character, special in service, founding requires care in the treatment of an established trade of known value, particularly in times of depression. We offer these suggestions because we believe that this element is a factor that cannot be disregarded in the appraisal of proposed new business of the uncertain

Table IV—Supplies Required for Varying Outputs

Output, lb.	0	10,000	20,000	30,000	40,000	50,000
Melting		$33.80	$58.00	$76.20	$88.40	$95.60
Sand		23.00	30.00	43.00	57.00	70.00
Oils, compounds		10.00	12.00	15.00	20.00	25.00
Tools		2.00	3.00	4.00	5.00	6.00
Maintenance		1.00	2.00	3.00	4.00	5.00
Miscellaneous		5.00	7.00	9.00	12.00	15.00
Supplies	$25.00	$74.80	$112.00	$150.20	$186.40	$216.60

duration and problematical earning power implied in the original question.

Discussion of the "Neutral Point"

IT seems possible to confine the "neutral point" within narrow limits by the following tentative definitions:

1.—It is the point where correction of operation becomes imperative, probably both in sales and in the shop. On the chart this point is not at a lower tonnage than at *A*.

2.—It designates the greatest tonnage which the proposed "skeleton" or "O" tonnage organization can handle effectively; as at *X*, Fig. 2, but, with a little concession, at *A*.

3.—It occurs at the normal or settled point of demand by the established trade, assuming a fair price as represented by the 6.40c. sales line. This is a local condition. We assume that it occurs at *A*.

What value accrues from the gain arising from the organization "squeeze" should be carefully appraised

Table V—Profit or Loss Recorded, According to Output

Output, lb.	0	10,000	20,000	30,000	40,000	50,000
Iron	0	$125.00	$250.00	$375.00	$500.00	$625.00
Supplies	$25.00	74.80	112.00	150.20	186.40	216.60
Selling expenses and defectives	10.00	16.00	24.00	33.00	40.00	50.00
All labor	372.00	654.80	950.50	1,242.90	1,535.55	1,838.80
Factory burden	70.00	87.00	101.00	115.00	129.00	143.00
Interest	83.00	91.00	99.00	107.00	115.00	123.00
Cost	$560.00	$1,048.10	$1,536.50	$2,023.10	$2,505.95	$2,996.40
Per pound		10.48c.	7.68c.	6.74c.	6.26c.	6.00c.
Sales at 6.40c.		$640.00	$1,280.00	$1,920.00	$2,560.00	$3,201.00
Loss	$560.00	$408.10	$256.50	$103.10		
Gain					$54.05	$205.00

at this point. Can it be maintained, or will it be lost as soon as production increases? Can it be maintained proportionately as indicated in the chart, tapering off to zero at 100 per cent plant rating? Does not the condition in the industry implied in the original question warrant a sustained reduction in general administrative labor, as well as in other items of the *R* expense? We are assuming that this latter procedure is the correct one, but the immediate effect of other decisions must be recognized.

4.—It is the point at which low-priced tonnage may be taken in sufficient quantity to reach the break-even point quickly. Assuming that the 23,600 lb. tonnage at *A*, at 6.40c. a lb., is firm, dependable business, the 6.25c. sales line will cross the new or "reorganized" cost line at *C*-1. The tonnages are then

(a) Old business	23,600 lb. at 6.40c., or	$1,510.40
New business	15,900 lb. at 6.00c., or	958.35
Sales	39,500 lb. at 6.25c., or	$2,468.75

The 6.15c. sales line will break even at *C*-2. The tonnages are then

(b) Old business	23,600 lb. at 6.40c., or	$1,510.40
New business	19,600 lb. at 5.85c., or	1,146.40
Sales	43,200 lb. at 6.15c., or	$2,656.80

The 6.0c. sales line will break even at 100 per cent rating, when the figures become

(c) Old business	23,600 lb. at 6.40c., or	$1,510.40
New business	26,400 lb. at 5.65c., or	1,489.60
Sales	50,000 lb. at 6.00c., or	$3,000.00

These figures confirm an opinion that, in times of depression, when a break-even condition is probably the best obtainable, it is good policy to tighten up, to economize, and to take on only that extra tonnage which, at a reasonable cut in price, will eliminate loss. Making drastic cuts on the theory that the shop *must* run to capacity to break even is a questionable measure. On the whole, this particular appraisal indicates that *A* is below the neutral point; action on the new tonnage has been deferred a little too long, except as the economies in *R* expenses have justified it. In like manner, an estimate of new business required if *R* economies are disregarded confirms this opinion. A comparison of the tonnages required for both the original and the new or "reorganized" cost line, to reach the break-even point at the different sales prices, is as follows:

	Old Cost Line	New Cost Line
(d) Old business	23,600 lb. at 6.40c.	23,600 lb. at 6.40c.
New business	17,400 lb. at 6.05c.	15,900 lb. at 6.00c.
Output	41,000 lb. at 6.25c.	39,500 lb. at 6.25c.
Per cent rating	82.0	79.0
(e) Old business	23,600 lb. at 6.40c.	23,600 lb. at 6.40c.
New business	20,800 lb. at 5.87c.	19,600 lb. at 5.85c.
Output	44,400 lb. at 6.15c.	43,200 lb. at 6.15c.
Per cent ratng	88.8	86.4
(f) Old business	23,600 lb. at 6.40c.	23,600 lb. at 6.40c.
New business	26,400 lb. at 5.65c.	26,400 lb. at 5.65c.
Output	50,000 lb. at 6.00c.	50,000 lb. at 6.00c.
Per cent rating	100.0	100.0

That is, if we are not going to be able to maintain the reduction in *R* expenses as we approach rated capacity—which is the condition shown on Fig. 2—then it does not pay to slash prices to fill the plant.

Our location of the "neutral point," on the basis of this analysis, is between points *A* and *B*—that is, it occurs after the operations fail to earn interest charges, but before they fail to earn "factory burden."

Its final location depends upon the amount of stabilized fairly priced business on the books; upon the strength of the "skeleton" or "O" tonnage organization; and upon the value of the proposed new tonnage, not only with respect to its price, but particularly as to the certainty and speed with which it will carry the operation to the break-even point.

An appraisal of the neutral point will disregard plant capacity or 100 per cent rating, and will seek to locate the economical tonnage, or the break-even point under conditions of minimum rather than of maximum output.

Conference on Simplification of Steel Sash

WASHINGTON, April 19.—A general conference on the simplification of solid-section steel sash at the Department of Commerce on April 28 has been called by Director W. C. Wetherhill of the National Committee on Metals Utilization. The items to be discussed include the division of products of the industry; standard nomenclature and simplification of sash sizes. The recommendations made are the result of a survey conducted by a committee representing manufacturers.

To Make Buses at Kent, Ohio

The Twin Coach Co., Kent, Ohio, has purchased from the American Car & Foundry Co. the plant in Kent, Ohio, formerly occupied by the Fageol Bus Co., which was taken over a few years ago by the Car & Foundry company and moved to Detroit. The new company will shortly begin the manufacture of buses. Frank R. Fageol, formerly at the head of the Fageol Bus Co. and Akron and Kent men are interested in the new company, which has been capitalized with $4,000,000 of 8 per cent preferred stock and 400,000 shares of no par common stock.

New Steel Mill Motors

A new line of steel mill motors, to be known as the MD-400 series, is announced by the General Electric Co. These motors have been designed in collaboration with the standards committee of the Association of Iron and Steel Engineers. They are of the roller bearing type.

Hoover to Address National Foreign Trade Meeting

Secretary of Commerce Hoover will be a principal speaker at the fourteenth annual convention of the National Foreign Trade Council in Detroit on May 25, 26 and 27. Mr. Hoover will be heard on May 26 at a special luncheon session under the auspices of the American Manufacturers' Export Association.

Other addresses at the convention will be by Roy D. Chapin, chairman of the board Hudson Motor Car Co., on "The Motor Influence in Our Foreign Trade;" Silas H. Strawn, chairman of the board Montgomery, Ward & Co., Chicago, on "Foreign Uses for American Capital." Governor Green of Michigan will also speak. There will be about 40 other addresses on various subjects.

Mexican Invoice Regulations

WASHINGTON, April 19.—The tariff item and rate of duty on goods shipped into Mexico must be indicated on their consular invoices, under a recent decree, according to a cablegram received by the Department of Commerce from Acting Commercial Attaché George Wythe, Mexico City. In addition to this, a Treasury order provides that the invoice classification of goods must be divided into two groups, consisting (a) of dutiable goods and (b) of non-dutiable. Government officials, the report said, have advised that tolerance will be shown during April for failure to comply with these regulations.

Charging and Igniting Ore for Sinter

Importance of Screens—Porous Bed for Active Charge — Method of Igniting — Carrying Gases Away

BY EDWARD J. TOURNIER

MATERIALS properly proportioned, mixed and screened when necessary, are deposited in a substantial bin at the top of the building. This bin is large enough for 6 or 8 hr. supply. From this point on it is fed by gravity to the charge car, pans and finally into railroad cars or stock pile.

At the bottom of this overhead bin is a roller feeder about 18 in. in diameter and 9 ft. long, direct connected through a gear reducer to a motor. The material is fed on to a set of Hummer screens with wire cloth having ⅜ in. by 1¼ in openings. The large pieces of sinter and other material from the moistened charge are screened out and deposited into the bedding hopper of the charge car, while the finer material constituting the charge is fed into the charge hopper of the car.

Screens Perform Several Functions

These screens are used for several purposes. In previous years, to get bedding or porous hearth for the grates, it was necessary to purchase foreign material or to screen out the coarse sinter from the return fines. In each case this material had to be conveyed to the charge car by separate conveying apparatus from that used by the regular charge. Now it is all handled together as one product, and separated as it is being deposited in the charge car.

Another purpose of the screen is to loosen the charge further as it rains lightly from the screen into the car. We have seen how the proper amount of moisture at the mixer increases the voids in the charge to the maximum. This looseness and these voids can be enhanced again by the fluffing action of the screen. If the screen is not employed, the material must drop 6 or 8 ft. from the overhead bin and pack into the car. This is then carried on into the sintering pan and the sintering action is curtailed. A dense hard sinter is produced and a loss in tonnage results.

By raining the material through the screen and charging the loose, fluffy material into the pan, the burning time is cut down about 20 per cent and the sintering zone proceeds in practically a horizontal plane from the top of the charge to the grates, making a pop-corn structure in the sinter and thoroughly sintering the charge.

Before using the Hummer screens in this fashion, a more or less segregation of the larger particles occurred in the bin above. This segregation was carried down through the charge car and into the pan, causing an uneven burning. With the screens now used, this segregation is counteracted and a layer is deposited in the pan practically uniform from one edge of the pan to the other.

These screens have been in use only since May, 1926, but have already demonstrated, beyond any doubt, their value in preparing the charge for sintering.

The charge car has two hoppers, one for the bedding or porous hearth and the other for the charge. The car is operated by a motor mounted on it driving the back axle through a gear reducer. There is a roller feeder the whole width of the pan on each hopper. The roller feeders are driven through gears in mesh with others mounted on the wheels of the car.

As the car reaches the end of the pan an idler gear in mesh with the roller feeder of the bedding hopper is dropped into mesh with its wheel gear. As the charge hopper reaches the edge of the pan, its gear, also, is thrown in mesh. The car travels over the pan on a track straddling the pan's width, depositing the bedding on the grates and the charge on top of the bedding. As it approaches the farther end each gear is lifted out of mesh in turn and the car passes on. The whole operation is done without stopping the car, in about 30 sec. In this operation the charge slides over a wide chute into the pan, with the minimum amount of packing possible.

Ignition

The ignition hood may be drawn along by the charge car or may be under its own power. In plants where there are several pans in line it is desirable to have the ignition hood self-propelled. After the pan is charged and the hood moves over the pan into place a frame around the edge of the hood is quickly dropped on the edge of the pan and the gas or oil and air pipes coupled to the supply lines opposite the pan. In the case of oil ignition, the oil is generally in a tank on the hood and piped to a series of horizontal spray burners placed about every 2 ft. apart under the hood.

Air and atomized oil are forced through the burners as the fan suction is applied and a torch ignites the oil. The flame spreads instantly and the whole hood is full of flame. Unconsumed oil deposited on the charge will cause that spot to remain unsintered. Hence it is necessary to atomize the oil carefully and to supply enough air to consume it completely before it touches the ore. There must also be a surplus of air, to supply oxygen to the ignited particles of carbon on the surface of the charge.

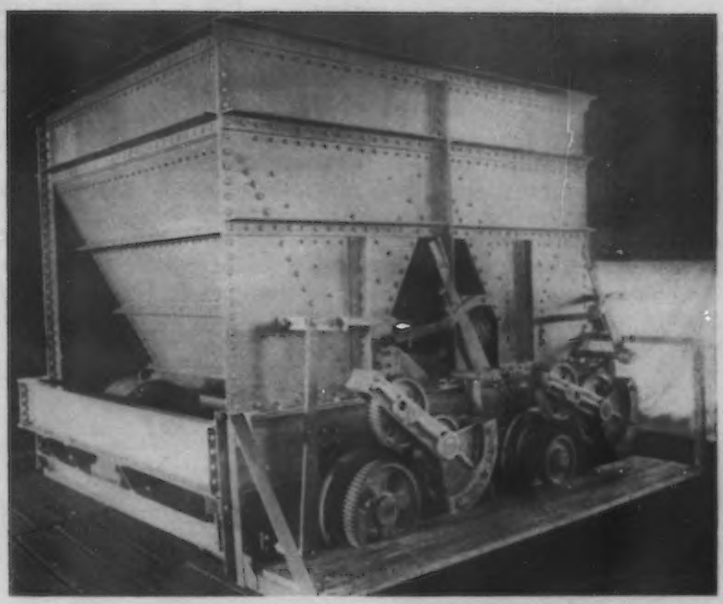
Products of combustion fill the hood, which is about 6 or 8 in. deep, and these products or flames are all sucked into the charge by the forced draft. The hood is the combustion chamber and the interstices of the porous charge in the pan is the smoke stack, while the surface of that charge, with its thousands of fine carbon particles, is being exposed to the intense heat and becomes ignited like glowing coals.

Quick, Intense Ignition Required

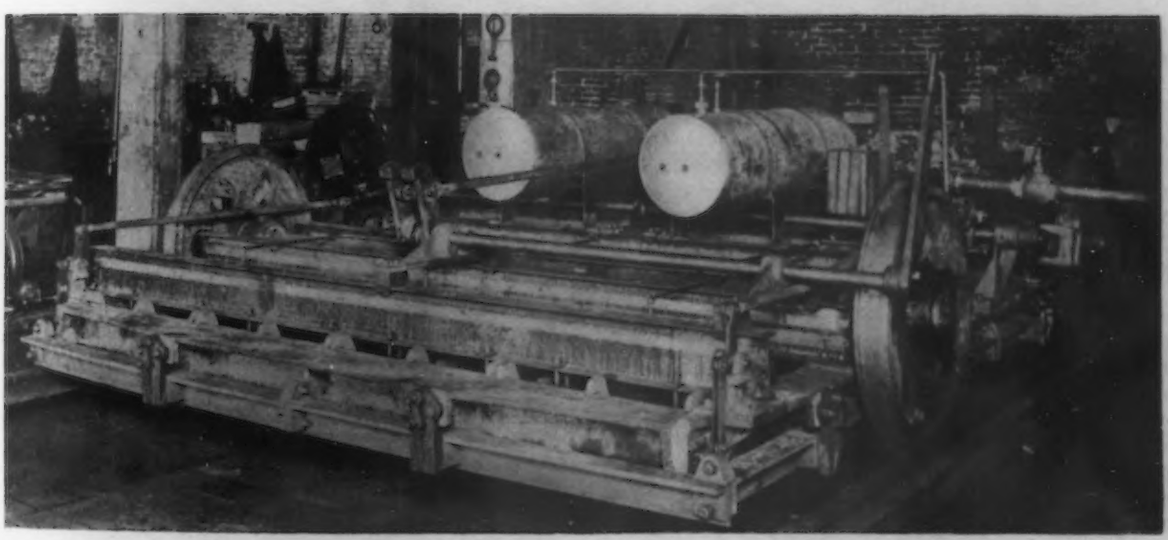
If the surface is dry it will not ignite or, upon doing so, will immediately go out after the hood is removed. Therefore the ignition must be quick and intense, and must take place while the suction is applied from beneath. There is no outlet for the products of combustion except through the charge. All unnecessary and injurious outside air is excluded, either by the sealing frame or by forcing the hood so full of flames that they lick out around the edges, and thus seal the

[This is the second of three installments of an article bringing intermittent sintering up to date. The first appeared at page 775 of THE IRON AGE for March 17. The third will discuss improvements in equipment, performance and costs, sintering of magnetic concentrates and the probable future trend of the process.]

OPERATING side of a Greenawalt Charging Car Appears at Right. The swinging gears for driving are prominent



Below Is an Oil-Burning Igniting Hood Fitted with Two Tanks for Supplying the Oil



EXHAUST Fan of Greenawalt Design. One top section of the casing has been removed to show the forms of the impeller and the diffuser. The portion of base plate at right takes the electric motor for driving

hood from injurious cooling effects of air currents. It takes from 30 to 60 sec. to ignite the surface.

Gas ignition is being more commonly used in recent years, where it is available. For this fuel the hood functions exactly as with oil. The gas is pumped into a manifold, mounted on the hood, along with the proper amount of air for its combustion. From here it is piped to a series of cross pipes lying in U-shaped castings, which constitute the top of the hood. The cross pipes are bored and supplied with small nipples about 6 in. apart. These nipples extend through holes in the U-shaped castings, at an angle to the surface of the charge. A small amount of air is siphoned into the hood around these nipples, and the gas and air mixture is forced into the hood, insuring its being completely filled with flame.

Special Fans for Suction

Suction for sintering is obtained by means of a fan, especially designed for this purpose, of extremely rugged and heavy construction. The casing is of inch-thick cast iron, and the impeller is inch-thick cast steel mounted on a 7-in. high-carbon steel shaft and is given a dynamic balance before shipment to the user. The gases enter from the bottom and are sucked into the impeller around the hubs. The curved blades throw the gases with high velocity through the diffusion ring around its periphery into the outside chamber of the fan. Here the gases are slowed down considerably and find their way through the outlet and to the stack.

The fan shaft, mounted on large water-cooled babbitted bearings, is directly connected through a flexible coupling to the motor, which is mounted on a cast iron base bolted rigidly to the fan casing. The motor is generally of 200 hp., although the actual operating power is about 135 hp., and has a speed of from 1500 to 1800 r.p.m., depending upon the suction desired.

The suction generally used for sintering flue dust is about 30 in. of water. In sintering iron ores, where the carbon content of the charge is more easily regulated, 35 to 45 in. is used to advantage. If there is too much carbon in the charge, a high suction may cause such intense heat as to form molten material which clogs the interstices of the charge and consequently an uneven burning and unsintered parts. This can be counteracted in high-carbon charges by the admixture of foreign material, as ore, roll scale, borings, etc., or by the use of a greater percentage of return fines. Where the carbon in the charge is right, a high suction is desirable. The burning is faster and the tonnage of the plant is increased without, in any way, destroying the quality of the sinter produced.

Trunnions Carry Away Gases

Hollow trunnions on each end of the pan are connected to pipes which carry the gases to a large concrete brick-lined chamber beneath the fan. The gases are sometimes watercooled on their way to this chamber. With proper grates and the use of porous bedding in the pan, and with no agitation of the charge in the pan nor air leaks undermining the charge, the amount of dust sucked through the pipes into the dust chamber is small. The chamber is generally cleaned out about once a month.

The fan runs continuously, although the draft is shut off from the pan during each dumping and charging period. This is accomplished by a bell valve built in the bottom or intake part of the fan casing. This valve is operated by a water, air or steam cylinder controlled by the operators on the pan floor.

Details of the Rotating Pan

The sintering pan is 10 ft. by 24 ft., built up of 3-in. thick air-cooled cast steel sides and ends with 20-in. hollow trunnions on each end. The bottom of the pan is steel plate riveted to the pan frame and six cast steel girders are bolted to the side frames. These girders support seven rows of cast steel rocking frames which, in turn, hold the semi-steel grate bars. A heavy bar of iron slides in guides at the bottom of the pan between each girder and the next. These bars are notched to take the protruding fingers of the rocking grate frames.

A gear segment is mounted around the trunnion on one end of the pan. Meshed with this gear segment, and 180 deg. apart, are two sturdy pinions driven through worm gears from the same motor. The hollow trunnions, supported on rollers, are connected to cast iron pipes from each trunnion, leading to the dust collecting chamber beneath the fan.

When the sintering charge is burned to the grates, the suction from the fan is cut off, and the pan is dumped by means of the two pinions and gear around its trunnion. As the gear segment leaves the one pinion, it is still in mesh with the other, and, as the revolution proceeds, it again comes in mesh with the first pinion and leaves the other. In this manner a complete revolution of the pan is easily accomplished in about 30 sec., the material is dumped from it and the pan is in position to take the next charge.

Rocking Grates Operate Automatically

As the pan is dumped, the heavy notched bars between the pan girders slide in their guides about a foot, pulling the fingers of the rocking grates with them. These rocking grates are mounted by means of pins at each end in bearing blocks on the steel girders. As the pan is upside down all the particles of dust and sinter beneath the grates are dumped out, automatically cleaning the wind box.

The grate openings aggregate about 12 per cent, made up of slots not over 5/16 in. wide. This amount of grate opening can be regulated by the width of bars used.

The grate opening area is important in sintering. The total suction of the fan should be exerted on the bottom of the charge. There should be no resistance either due to the grates being clogged with sinter or through not enough grate openings in the original grates. The holes or slots should be small in themselves, so that holes will not be sucked in the charge. But there should be plenty of them and they should be kept clear of foreign matter, so that all the power exerted by the fan may be applied to the bottom layer of the charge itself.

Depth of Bed Varies with Charge

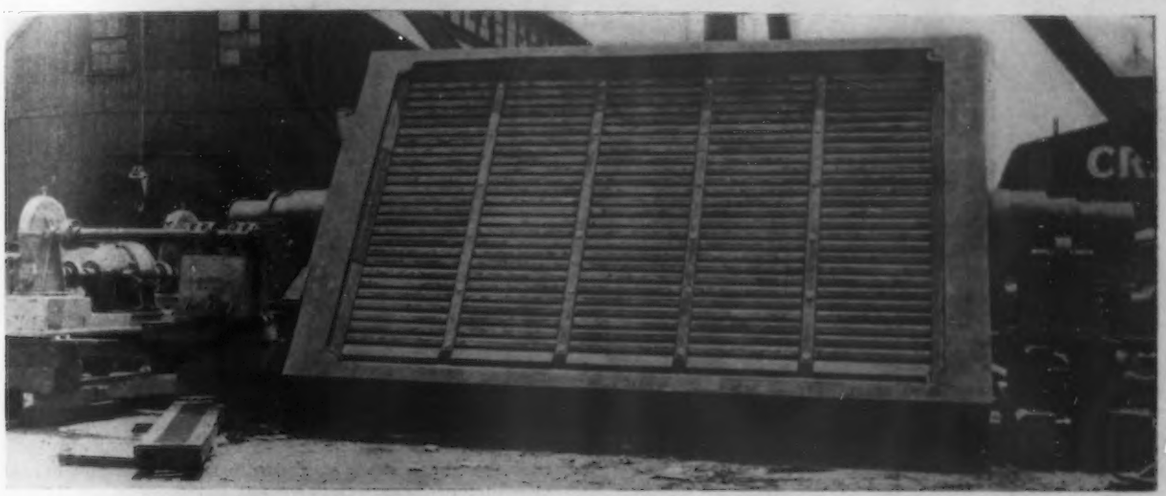
The depth of bed used is from 6 to 10 in. In some cases it is less or more, but this depth is regulated, depending upon the nature of the charge being sintered. Liners beneath the grate bar support are provided, to change this depth to that desired. In high-carbon charges, if the bed is too deep the accumulated heat as the sintering proceeds causes a fusion action, which clogs the gas passages and dries out the bottom layers of the charge so that it will not sinter. If the charge is fairly coarse and the carbon low, a deeper bed can be sintered without this fusing action taking place, and with the result that a larger tonnage can be attained in each charge. Generally speaking, flue dust sinters best at 6 or 7-in. depths, and ore, where carbon is controlled, at 8 to 10-in. depths.

The sinter drops from the pan into a bin beneath. This bin is housed on all sides, and the pan itself forms the cover when it is in the horizontal position. A series of suspended gates retards the sinter from rushing too fast over the screens. Grizzly bars placed about 8 in. apart take off the coarse cakes of sinter, while the rest drops through to a wire-mesh screen of sturdy construction about 15 in. below the grizzly. This wire-mesh screen is made of crimped wire about

5/16 in. diameter, and has ¾-in. clear openings. The screen is at an angle of about 40 deg., but is adjustable from 30 to 50 deg. There are about 260 sq. ft. of screen surface. This large screen surface, coupled with the grizzly above and the retarding action of the gates in the sinter bin, assures as perfect screening as can be obtained without the use of mechanical screens.

No Need to Make a Dusty Plant

By properly constructing a sintering plant, there is no necessity for the excessive dust conditions so common and objectionable in all older sintering plants.



Top of a Greenawalt Sintering Pan 10 x 16 Ft. in Size, Showing the Arrangement of Grate Bars, the Heavy Turning Trunnions Used and the Geared Turning Rig

Hot, dry flue dust should not be dumped at a sintering plant. It should be thoroughly moistened at the furnace, or before it is sent through the regular conveying system of the sintering plant, and, if possible, it should be allowed to cool after moistening. This should be done in the interest of better sintering results and tonnage, if not for general cleanliness.

There is a certain amount of steam and dust about the return fines feeders and mixer. By installing proper ventilating drafts through the elevator shaft and stacks, this steam and dust can be controlled.

When the pan is dumped there is a certain amount of dust arising, especially in plants where too deep a bed is being sintered for the material used, or when mixing, charging or grate conditions permit an uneven sintering, with resultant dead spots in the charge. The pan or pans should be inclosed from the working platform by a sheet steel partition and with a large ventilating opening over each pan. The dust conditions are only momentary, and with the controls and working platform outside the partition, the men are protected from the dust.

Sharp Gain in River Coal Traffic at Pittsburgh

Traffic over the Allegheny, Monongahela and Ohio rivers within the district of the United States Engineers at Pittsburgh jumped sharply in March as compared with the month before, with a total of 3,403,893 net tons, or 576,033 tons more than in February. Much of the increase was in the movement of coal, which in March was almost 444,000 tons larger than in February. There was an increase of approximately 7000 tons in the shipment of iron and steel products.

The figures in net tons follow:

Commodity	Allegheny River	Monongahela River	Ohio River	Total
Coal	22,483	2,276,113	589,893	2,888,489
Coke	16,000	48,782	.....	64,782
Gravel	33,200	74,900	57,078	165,178
Packet cargo	.....	.....	3,759	3,759
Sand	33,900	75,375	77,027	186,302
Iron and steel products	600	36,112	29,016	65,728
Miscellaneous	2,250	18,546	8,859	29,655
Total	108,433	2,529,828	765,632	3,403,893
Total for February	85,605	2,117,558	624,697	2,827,860
Total for January	89,242	1,935,879	621,496	2,646,617

Cramp's to Quit Shipbuilding

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, which has conducted a shipyard for 97 years, will quit shipbuilding within the near future, it has been announced by J. Harry Mull, president. Curtailment of naval construction by the United States Government and the depressed condition of merchant shipbuilding are given as the reasons for the change of policy. Secretary of the Navy Wilbur has permitted the transfer of a contract for the building of the scout cruiser Salt Lake City to the American Brown Boveri Electric Corporation, Camden, N. J., which has the shipyard formerly operated by the New York Shipbuilding Corporation. Three other vessels of the merchant type now under construction at the Cramp shipyard will be completed.

With the abandonment of shipbuilding, the company will confine its activities to its other lines, which were segregated last year in a holding company known as Cramp-Morris Industrials, Inc. These subsidiary companies include the De La Vergne Machine Co., I. P. Morris Corporation, Pelton Water Wheel Co., Federal Steel Foundry Co., Cramp's Brass & Iron Foundry and Cramp Engine Mfg. Co. Their operations cover the manufacture of Diesel engines, castings and hydraulic and other machinery.

Otis Steel Co. to Transport Steel and Scrap by Water

The Otis Steel Co., Cleveland, is planning to provide a water transportation line for shipping finished steel from Cleveland to Detroit and bringing back scrap. The company is negotiating for the purchase or lease of four small boats to be fitted up for this purpose and plans to equip the dock at its plant for the direct handling of steel and scrap.

American trade marks registered in the Philippine Islands are now regarded as valid for the full term of 30 years granted to Philippine marks, regardless of the duration or registration of the mark in the United States, according to a report received by the Department of Commerce from Trade Commissioner O. M. Butler, Manila.

Theory to Explain Abnormal Steel

Presence of Unusual Amount of Dissolved Oxygen Promotes Non-Hardenability—Results of An Investigation of Many Steels

BY JOHN D. GAT

THE possibility of the selection of suitable material for carburization from a shipment of steel before subjecting it to manufacturing processes is of large industrial importance.

Shortening of the McQuaid-Ehn Test

Consumers of steel, having only one means for accomplishing this, the McQuaid and Ehn test, and having also but little information regarding its interpretation, concentrated their attention on the study of images revealed by the microscope on specimens carburized according to the specifications of the test. In many cases it was possible to observe a certain relation between given peculiarities of the structure and the final behavior of the metal. They were associated, disregarding all other variables. In a majority of cases, the establishing of such a relation terminated any further study of the subject.

The situation so created introduced a considerable amount of misunderstanding and trouble when the results of these observations were incorporated in the specifications submitted to the steel mills. The manufacturers were obliged to make metal which had to meet certain requirements, revealed by a test containing several variables, none of which has received as yet any amount of scientific study and the relative importance of which was not established.

The purpose of the original McQuaid-Ehn test was the discrimination between satisfactory and non-hardenable metal, a test designed for shop practice and dealing with magnitudes not requiring any special refinement. With sufficient precautions, a difference can be found everywhere and features of decidedly secondary importance can be brought to the state where their influence becomes a pronounced factor often leading to erroneous conclusions.

Investigating the True Cause of Abnormality

In the investigation directed toward the establishment of the true cause of non-hardenability, the results of which are recorded in the following discussion, refinement of experimental procedure was purposely omitted and the methods used were, so far as was possible, reproductions of ordinary commercial practice where quenching is conducted in tap water and uniformity of hardening understood as within three points, Rockwell C.

Designating as "abnormal" a steel which will not harden uniformly in tap water introduced a basis from which all conclusions could be drawn without the necessity for any arbitrary definitions and permitted one to find which of the many features of the carburized zone, mentioned in the original paper by McQuaid-Ehn as related to this property, are the result of a condition causing non-hardenability and which are functions of ordinary crystallization common to all steels.

It was thought more reliable to depend on figures furnished by close cooperation between steel makers and men in charge of case-hardening shops at the consuming end of the cycle than to use data furnished by laboratory means only. Only in cases where data so obtained were lacking sufficient precision or involved features liable to obscure the meaning of observations were the results verified under laboratory conditions with a necessary degree of accuracy.

Several hundred heats, mostly alloy steels, represented by many thousand samples, were checked for their microscopical appearance after carburizing before releasing them from the plant. The results of final heat treatment were compared with microscopical records of corresponding heats. All information, derived from this source in a course of several years, indicated that there is no difference in hardenability between steels having a widely varying shape and size of grains. Steels with rounded grains of greatly different dimensions hardened with the same ease as metal with large uniform rectangular grains.

The question of the influence of the grain size is of the utmost importance, because association of small grained with non-hardenable and large grained steels with satisfactory ones is accepted almost universally.

Experiments conducted in order to demonstrate the influence of quenching, normalizing and annealing on the final grain size showed that, previous to carburizing,

Fig. 1.—Eutectoid Alloy of Iron-Oxygen and Carbon Surrounding Cementitic Mesh in Hypereutectoid Zone. Etched deeply with nital. X 1500

heat treatment does not affect the character of the carburized zone in any way. The necessity for passing through the critical point in carburization, involving recrystallization of the entire mass of steel, totally obliterates pre-existing structure. Not only the normal crystalline structure is destroyed but, even in ordinary cases, severe cold working or excessive grain size induced by critical strain do not have any effect on the size and but a slight one on crystalline outlines. Each heat of steel possesses presumably certain factors, imparted to it in the process of making, which regulate the size of austenitic grains. They are brought into action as soon as the upper critical is passed and are dormant until all iron is transformed into the gamma state.

Crystalline dimensions, as developed by carburizing test, are a constant for a given steel as long as carburizing conditions remain the same. With increased molecular mobility, caused by a rise of temperature, the influence of factors controlling the size of austenitic grains gradually diminishes and increased temperature of carburization is accompanied by almost proportional enlargement of crystalline units. At a sufficiently high temperature the difference in grain size, easily seen at

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a normal carburizing temperature, disappears though the characteristic shape of grains remains unchanged.

While the amount of carbon absorbed by a specimen is proportional to time and temperature, the character of carburized zone depends on temperature only. Time can show itself in increased depth of eutectoid zone alone. If the temperature is not changed, any length of carburizing time will produce identical hypereutectoid and gradation zones.

Grain Size and Uniform Hardening

A very large number of comparisons of grain size with resistance to uniform hardening, conducted both in the laboratory and in plants scattered all over the country and representing quite fully present commercial practice, failed to support the point of view that small grain in steel is inducive to hardening troubles. In every case, when pearlitic grains in hypereutectoid zone were surrounded by cementite alone, the steel hardened uniformly.

The work, connected with the study of properties of steel possessing different grain sizes, covered simultaneously the influence of cementite distribution at the grain boundaries. Smaller grain size goes usually hand in hand with the increase of the ratio-free cementite-pearlite in the hypereutectoid zone. It is not clear whether areas of these constituents, often of the same size and observed in the outer layers of carburized small-grained steels, can be identified with "clubbed cementite" generally associated with non-hardenable steels. Careful study of the subject showed that distribution of cementite is not a constant for a given steel but is a function of the temperature, and that it has no perceptible effect on hardenability of the metal.

The comparison of cases formed on large and small-grained steels, especially when made by comparing fractures or with the unaided eye, leaves an impression that in the former case the depth is greater. The generally accepted statement, that large-grained steel has a better carbon penetration, was checked by carefully carburizing a representative number of samples belonging to heats of the same analysis but having different grain sizes. The amount of carbon absorbed was determined by weighing, and the depth of case estimated under a microscope as an average of many readings. As the separating line between the case and the core in this series, an area was used containing about 0.40 per cent carbon as it appears in the fully annealed state. Several carburizing temperatures were studied but, as their results are in good accord, only one set of figures, corresponding to commercial practice, is given.

In an accompanying table, summarizing the data obtained in this carburizing series, heats having larger grain size as determined by a preliminary test are recorded in the first place of a given type. The numbers in the second column give an average number of milligrams absorbed by specimens. The third column represents a somewhat arbitrary value of carbon absorption, obtained by division of the total amount of carbon alloyed with specimens by their surface and depth of case.

The amount of carbon absorbed by small and large-grained specimens of the same composition was the same. Depth of case formed, allowing for the experimental errors, was the same for practical purposes, varying inside of 5 per cent from an average.

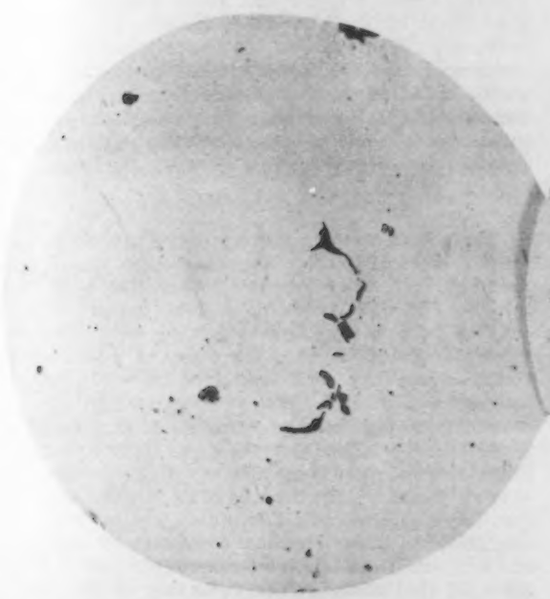


Fig. 2.—Core of a Carburized Specimen. Carbon, 0.02 per cent; oxygen, 0.10 per cent. Etched with sodium picrate. X 500

Fig. 3.—Core of a Carburized Specimen. Carbon, 0.10 per cent; oxygen, 0.10 per cent. Etched with sodium picrate. X 500

One Cause of Hardening Troubles

Hardening troubles were encountered when the cementitic mesh of a steel was imbedded in a layer of a substance softer than cementite. In more pronounced cases the layer surrounding the cementite broadens, and one encounters so-called divorced pearlite when wide areas of a white substance, after etching with acids, are found between cementitic network and the boundaries of crystals and even between lamellae of pearlite.

Table of Data Obtained in Carburizing Series of Tests Carburized at 1725 Deg. Fahr. (940 Deg. C.)

S.A.E. No.	Carbon Absorbed in Mg.	Absorption Value	Depth of Case
1020	134	1.245	1.10
1020	136	1.248	1.09
2315	125	1.250	1.00
2315	127	1.233	1.03
2515	123	1.242	0.99*
2515	123	1.042	1.18
3115	132	1.100	1.20
3115	133	1.050	1.26
6120	155	1.260	1.25
6120	153	1.225	1.23
Cr-Ni-V	144	1.189	1.21
Cr-Ni-V	142	1.136	1.25
½% Ni	133	1.385	0.96
½% Ni	132	1.434	0.96

*Pronounced banding.

"Divorced pearlite" implies that the white substance is ferrite, but observations do not support this point of view. Rejection of cementite in hypereutectoid zone does not need any comments, but the fact that it is followed by precipitation of a considerable amount of ferrite cannot be accounted for, based on properties of iron-carbon equilibria shown in the constitutional diagram.

The explanation of the phenomena lies in a closer

study of the properties of the white substance. Deep etching indicated that, from the metallographical standpoint, there is a pronounced difference between ordinary ferrite and this substance. Scratch hardness, equal to the hardness of pearlite, introduces another point of difference. Corrodibility by acids as well as sodium picrate places it in a class by itself. The latter reagent attacks it in hypereutectoid zone weakly but quite easily in other regions of the sample.

Some light is thrown on the subject by the oxygen content of the samples having lined cementite. No difference can be seen in chemical composition of steels containing it and free from it unless gas content is determined. The percentage of hydrogen and nitrogen is the same in both cases. Oxygen content in the former case is about ten times as high.

Hardness and microscopical appearance of the substance surrounding cementite can serve only as indices of its being of a different nature than ferrite. Theoretical considerations deduced from the properties of

Fig. 4.—Gradation Zone of a Carburized Specimen. Carbon about 0.20 per cent; oxygen, 0.10 per cent. Note eutectoid envelopes around pearlitic grains. Relief polished and slightly etched with nital. X 100

the iron-carbon system bring a better understanding of the phenomena taking place, but they must necessarily be of a tentative character.

High-Oxygen Steel Must Be Considered

Examining the core of carburized high-oxygen steels, it is not difficult to see that a substance, dissimilar to the mass of ferrite, is rejected to the grain boundaries. Its appearance does not suggest any of the already known constituents of steel. It seems to be harder than the ferritic matrix and can be brought out comparatively easily by relief polishing. As one never encounters it in completely deoxidized steels, it is natural to expect here an iron-oxygen compound, though the color of it does not even resemble any of the known oxides of iron. If it were an oxide of iron, insoluble in ferrite at room temperature, one could expect that a given oxygen content would specify a definite amount of it rejected at the grain boundaries.

In three steels selected to illustrate this point, the oxygen content was the same, 0.10 per cent, but the percentage of carbon varied. Looking at a very low, 0.02 per cent carbon steel, one can see only a few inclusions of this type. With 0.10 per cent their number increases and when carbon was raised by carburization to about 0.20 per cent every grain of pearlite was surrounded by a film of this substance. Its percentage rises with increased carbon content until, in the hypereutectoid zone of highly oxygenated steels, it strongly predominates over pearlite and cementite.

Explains White Substance Around Cementite

One is led to believe that the white substance, surrounding cementite, is identical with inclusions in lower-carbon regions of highly oxygenated steels and quite probably is a ternary alloy of iron and carbon, containing a considerable amount of oxygen. This assumption makes it possible to account for the crystallographic peculiarities of high-oxygen steels. Austenite is capable of holding in solution a comparatively large amount of oxygen. On cooling, two sets of transformations take place: Normal allotropic changes in iron, and changes induced by the presence of oxygen. Precipitation of proeutectoid cementite, taking place in the gamma range, is not affected by the presence of oxygen at all. Cementitic mesh, so formed, is filled with a still homogeneous mixture of austenite and oxygen in whatever form it might be present.

With the lowering of the temperature the uniformity of the mixture is destroyed and a constituent of higher oxygen content and lower fusibility begins to precipitate at the grain boundaries. Its solubility is presumably a function of the temperature and rejection continues until the lower critical is reached and the eutectoid alloy of iron and carbon, with traces of oxygen, is transformed into pearlite. Identical reasoning can be applied to hypoeutectoid steels, substituting proeutectoid cementite with proeutectoid ferrite.

Explaining the New Theory

These data seemingly support the idea that anomalities in crystallographic appearance are caused by abnormally high oxygen content where the latter is not fixed in difficultly reducible oxides. Having the presence of an iron-oxygen-carbon alloy as a criterion, it was not difficult to conduct a series of experiments directed toward the establishing of its influence on the properties of steel.

Omitting the lengthy description of experimental procedure, it will be interesting to tabulate the results. Grain size of steel is not in any way connected with oxygen content. Highly oxygenated steel may have very large or quite small crystals. The amount of carbon, absorbed under identical conditions by oxygen free and oxygenated steel, is about 20 per cent higher in favor of the former. The reduction of the depth of case is even more pronounced and marked by strong lack of uniformity. Hardening properties of steel are detrimentally affected by this element. The reactions taking place in quenching become sluggish so that the usual quenching medium, tap water, cannot affect it uniformly all over the surface and the difference in hardness between two adjoining areas on the surface may, as a general rule, vary between 20 and 30 points, Rockwell C. Steels having lined cementite never can be uniformly hardened under normal conditions.

Excessive Oxygen Causes Abnormality

These remarks permit one to draw the separating line between the real causes producing the resistance to hardening and other features associated with the conception of "abnormality." Non-hardenability is caused by the presence of an excessive amount of oxygen. The grain size is a function of furnace practice, especially the method of the addition of deoxidizers, and in no way connected with the degree of deoxidation. All other indices, generally associated with resistance to uniform hardening, like the character of gradation zone, shape of crystals, relative dimensions of adjoining crystalline units, etc., are the results of the phenomena of recrystallization and grain growth and can be present in badly oxidized as well as thoroughly-freed-from-oxygen steels.

Abnormal steel, synonymous with oxidized (a), is in every respect inferior for carburizing purposes to the metal properly freed from dissolved oxygen. All steels not having in them any iron-carbon-oxygen alloy, discernible under the microscope, will harden entirely satisfactorily. The grain size has a pronounced influence on physical properties only. The carburizing test of McQuaid and Ehn gives an invaluable tool for determination of grain size and non-hardenability. For determination of the latter property, etching with sodium picrate of polished specimens of hot-finished or annealed steels for the presence of iron-carbon-oxygen inclusions will give quite satisfactory results in a small fraction of time necessary for the former.

(a) This was pointed out quite recently in Europe by Feszchenko-Czopowsk, "Cementation du fer, nickel et cobalt par le bor." *Travaux de l'academie des mines a Cracovie*, vol. V, 1925.

Supreme Court Upholds Companies

Decision in Claire Furnace Co. Case Directs Dismissal of Proceedings to Force Iron and Coal Companies to Divulge Cost Data

WASHINGTON, April 18.—The Supreme Court of the United States today reversed decisions of the lower courts in the well-known Claire Furnace Co. case on procedural grounds, and remanded it to the Supreme Court of the District of Columbia with direction to dismiss the proceeding. It has been in the courts seven years. The decision of the highest tribunal was handed down, by a vote of six to one, through Chief Justice William Howard Taft. Mr. Justice Sutherland and Mr. Justice Butler did not participate in the decision. Mr. Justice McReynolds dissented. The reason for non-participation by Mr. Justice Butler is not known.

It is assumed that Mr. Justice Sutherland took no part in the case because he was in the Senate when the Federal Trade Commission was authorized to require industries to furnish it monthly reports of the cost of production, balance sheets, and other voluminous information in detail upon a variety of subjects relating to business. He then opposed such a grant of power.

Twenty-two Companies Involved

The Claire Furnace Co. case included 22 independent iron and steel, coal and related companies of Ohio, Pennsylvania, West Virginia, New York, Delaware, New Jersey and Maryland, and was bitterly fought from the outset. The companies secured injunctions restraining the commission from enforcing its orders. These were granted by the Supreme Court of the District of Columbia and the District Court of Appeals, to which the commission had appealed, after which it turned to the Supreme Court of the United States.

The latter court held, in its decision, that the commission should have requested the Attorney-General of the United States "to institute proceedings for a mandamus or supply him with necessary facts for an action to enforce the orders of the commission." The Supreme Court thus did not pass upon the merits of the case and, as a matter of fact, it is left where it started. It is thought the commission will now ask the Attorney-General to institute mandamus proceedings against the iron and steel companies.

The commission had from the outset sought to mandamus the iron and steel companies through courts in New Jersey and Pennsylvania, but in both instances the companies succeeded in obtaining injunctions. What action the iron and steel interests may take in the event mandamus proceedings are instituted through the Department of Justice remains to be seen.

In his brief dissent Mr. Justice McReynolds pointed out that the case had been before the courts seven years, and that they had no right to interject into the record a question which was not raised or argued before either of the lower courts—the Supreme Court of the District of Columbia and the District Court of Appeals.

Cost Data Asked to Reduce Living Costs

When it proceeded against the iron and steel companies, the commission claimed it was acting under authority of a resolution adopted by it on Dec. 15, 1919, based upon a suggestion made to the Committee on Appropriations of the House of Representatives, when the commission was asked what it might undertake to do to reduce the cost of living. The commission said it would be desirable to obtain and publish from time to time the current information with respect to "the production, ownership, manufacture, storage and distribution of foodstuffs, or other necessaries, and the products or by-products arising from or in connection with the preparation and manufacture thereof, together with figures of cost and wholesale and retail prices," and particularly with respect to various basic industries, including coal and steel.

Congress subsequently made an appropriation of $150,000 to permit the commission to proceed, which it attempted to do under Section 6 of the Federal Trade Commission Act, starting with coal and steel, and being balked by injunctions in each instance. The coal case still is pending, but the decision in the Claire Furnace Co. is accepted as being tantamount to a decision also in the coal case.

Questionnaires Ignored by Companies

In the steel case the commission sent out elaborate questionnaires calling for detailed reports on cost of production, balance sheets, etc. These were refused. Court proceedings followed, and injunctions restraining the commission from enforcing its orders. The trial court, as pointed out in the Supreme Court decision, concluded, that as the propounded questions were not limited to interstate commerce, but asked also for detailed information concerning mining, manufacture and intrastate commerce, they were beyond the commission's authority.

The Supreme Court said that the action of the commission must be justified, if at all, under paragraphs of Sections 6 and 9 of the Federal Trade Commission Act, and that the only methods prescribed for enforcing orders permitted by any of these paragraphs are specified in Sections 9 and 10. They are making application to the Attorney-General to institute an action for mandamus and proceedings by him "to recover the prescribed penalties."

The Supreme Court quoted the pertinent paragraphs of Sections 6 and 9 conferring upon the commission power to gather information concerning, and to investigate, the organization, business, conduct, practices and management of corporations, excepting banks and common carriers, and to require by orders the filing of reports in answer to specific questions. Provision also is made for furnishing documentary evidence of any corporation being investigated, with the right of subpoena given to the commission. Upon application of the Attorney-General, at the request of the commission, "the district courts of the United States shall have jurisdiction to issue writs of mandamus commanding persons or corporations to comply with the provisions" of the act, "or any order of the commission made in pursuance thereof."

Commission Said to Have Exceeded Its Authority

The iron and steel companies took the ground that the commission was attempting to exceed its authority, especially in trying to secure information that concerned only intrastate commerce, such as, they claimed, mining and manufacturing are.

"There was nothing which the commission could have done to secure enforcement of the challenger or-

ders except to request the Attorney-General to institute proceedings for a mandamus, or supply him with the necessary facts for an action to enforce the incurred forfeitures," said the Supreme Court of the United States. "If, exercising his discretion, he had instituted either proceeding, the defendant therein would have been fully heard and could have adequately and effectively presented every ground of objection sought to be presented now. Consequently the trial court should have refused to entertain the bill in equity for an injunction.

Attorney-General Must Judge the Propriety of Inquiries

"We think that the consent of the parties was not enough to justify the court in considering the fundamental question that has been twice argued before us. It was intended by Congress, in providing this method of enforcing the orders of the Trade Commission, to impose upon the Attorney-General the duty of examining the scope and propriety of the orders, and of sifting out of the mass of inquiries issued what, in his judgment, was pertinent and lawful, before asking the court to adjudge forfeitures for failure to give the great amount of information required, or to issue a mandamus against those whom the orders affected and who refused to comply. The wide scope and variety of the questions, answers to which are asked in these orders, show the wisdom of requiring the chief law officer of the Government to exercise a sound discretion in designating the inquiries to enforce which he shall feel justified in invoking the action of the court.

"In a case like this, the exercise of this discretion will greatly relieve the court and may save it much unnecessary labor and discussion. The purpose of Congress in this requirement is plain, and we do not think that the court below should have dispensed with such assistance. Until the Attorney-General acts, the defendants cannot suffer; and when he does act, they can promptly answer and have full opportunity to contest the legality of any prejudicial proceedings against them. That right being adequate, they were not in a position to ask relief by injunction.

"This conclusion leads to a reversal of the decree of the District Court of Appeals and a remanding of the case to the Supreme Court of the District of Columbia, with direction to dismiss the bill."

Structural Silicon Steel Has Special Properties

Results of Some German Open-Hearth Heats—Details of Composition and Physical Tests—Bosshart and Regular Heats Compared

INFORMATION on the behavior of 1 per cent silicon steels has recently appeared in the technical press, and the favorable effect of this percentage of silicon in low-carbon steels in increasing the elastic limit and ultimate strength, while not lowering the elongation and reduction of area, has been commented upon. The information in question, however, is all based upon special test heats made for the purpose. J. Meiser, of Dortmund, in *Stahl und Eisen*, March 17, 1927, page 446, gives the results of high-silicon steel heats made in regular operating routine which are of immediate interest to engineers.

Composition and Physical Properties

In constructing a bridge over the Weser, the Dortmunder Union works of the United Steel Co. required 900 tons of steel. This was to be made in a tilting open-hearth furnace of 80 tons capacity. To date eight of the heats have been made, about 600 tons of the order, and the composition of these heats is as follows:

> Carbon, from 0.13 to 0.19; silicon, from 0.80 to 1.37; manganese, from 0.84 to 1.14; phosphorus, from 0.018 to 0.044; and sulphur, from 0.033 to 0.048 per cent.

The average composition (assuming the heats to be all of practically the same tonnage) is carbon, 0.15; silicon, 1.07; manganese, 0.98; phosphorus, 0.029; sulphur, 0.037.

The specifications called for a minimum elastic limit of 51,000 lb. per sq. in.; ultimate tensile strength of 68,270 lb. per sq. in. and an elastic limit of 20 per cent. The actual results for the shop tests were as follows: Elastic limit, from 55,470 lb. to 63,720 lb., with average of 59,025 lb. per sq. in. The ultimate strength ranged from 72,110 lb. to 82,780 lb., with an average of 78,795 lb. per sq. in. The elongation ran from 23.0 to 27.0 per cent, averaging 24.4 per cent. In the official tests for acceptance, the elastic limit ran from 52,625 to 59,735 lb., with an average of 56,325 lb. per sq. in. The ultimate strength ranged from 72,535 to 82,495 lb., with an average of 77,515 lb. per sq. in. The elongation ran from 23.0 to 27.0 per cent, with an average of 24.9 per cent. The specification requirements were, therefore, exceeded considerably.

Results From a Second Set of Heats

Another series of results is given, as obtained from silicon steels made in a Rhenish establishment rolling steel for railroad purposes. The heats were made in 17-ton open-hearth furnaces, and had an average composition of carbon, 0.17; silicon, 0.91; manganese, 0.97; phosphorus, 0.032; sulphur, 0.035 per cent. The average elastic limit ran from 52,770 to 61,445 lb., with an average of 56,470 lb. per sq. in.; the ultimate strength from 72,905 to 80,215 lb., with an average of 77,800 lb. per sq. in. and the elongation from 22.0 to 27.0 per cent, with an average of 24.2 per cent. The reduction in area ranged from 39.0 to 63.0 per cent, with an average of 54.2 per cent.

The test pieces for the Dortmund works were from 1.122 in. to 2.087 in. in width, 0.303 in. to 0.484 in. in thickness, and a test length of from 6.378 in. to 8.661 in. Those for the Rhenish works were from 1.189 in. to 1.606 in. wide, 0.201 in. to 0.421 in. thick, and a test length of from 6.249 in. to 7.874 in.

Bosshart and Ordinary Furnaces Compared

The tests previously published had been made in an open-hearth furnace of the Bosshart construction, and the average results are given as follows: Elastic limit, 53,760 lb. per sq. in.; ultimate strength, 73,105 lb. per sq. in.; elongation, 26.3 per cent. and reduction in area, 63.7 per cent.

A comparison of these figures with the results of the Dortmund and Rhenish works indicate that the open-hearth furnace of ordinary construction is perfectly able to furnish silicon steel equal to requirements as usually made of this class of steel.

In cooperation with the United States Bureau of Mines and the State Mining Experiment Station, the school of mines and metallurgy of the University of Missouri offers four fellowships. These are open to graduates who have the equivalent of a bachelor of science degree and have had the proper training in mining, metallurgy, or chemistry, and who are qualified to undertake research work. The income of each fellowship is $800 per annum for the 12 months beginning July 1, 1927. Fellows pay fees amounting to approximately $30 per year. Applications, with a certified copy of collegiate record, statement of professional experience, and names and addresses of three references will be received up to June 15, 1927. The application should be addressed Director, School of Mines and Metallurgy, University of Missouri, Rolla, Mo.

Abstracted from the German by Dr. Richard Moldenke, Watchung, N. J., with comments.

Repeal the Manganese Ore Duty

Advocated by Prominent Engineer—Tariff Based on Erroneous Theory—Two Plans Suggested for Permanent Supplies

BY JOHN V. W. REYNDERS

OUR entry into the World War suddenly brought home to us in a startling way the vital importance of manganese. Since the war, much has been written and said upon the subject of manganese and a great deal of time and money have been spent in attempts to find an adequate substitute for this metal in the manufacture of steel; none has been found. It is true that ways are known by which it is possible to make small amounts of good steel without manganese, but taking into consideration the diminishing quality of iron ores and fuels as well as the increasing exaction of specifications for finished products, it may safely be assumed that high-grade manganese ore will be more and more a necessity in the production of steel as time goes on.

Taking world resources as a whole it may be well to point out that the problem of obtaining needed supplies of manganese from a stricly commercial viewpoint is now less serious than it was before the war. Formerly it was feared that world resources of high-grade manganese ore might be exhausted in a relatively short time, but, largely as a result of the stress laid upon the importance of manganese during the war, the world's available supply of high-grade manganese ore has been greatly augmented by new discoveries and fuller development of previously known deposits.

[The author here discusses briefly the resources of the leading countries—Russia, India, Africa, Brazil and others.]

Resumé of World Resources of Ore

The low cost of production from the four great sources, Russia, India, Gold Coast and Brazil, the magnitude of their reserves, their accessibility to water transportation and their ability to expand production readily are the factors which tend to making the mining of manganese in other sections of the world non-commercial. As an example, Cuban production was relatively constant for some years until 1926, when a drop in price caused cessation of shipments. Chile likewise is a marginal producer. It would seem probable that deposits of manganese other than those mentioned will be forced to remain dormant until economic exhaustion is more nearly approached by the four great sources. It must be taken into consideration that with the possible exception of the Gold Coast in Africa, a combination of two of any of the three great sources could with comparative ease supply the world's present demands of relatively 2,400,000 tons.

Position of the United States

The position of the United States is clearly that of a consumer, as the known domestic resources of high-grade ore would not supply our present requirements for 2 years, even if all of the ore could be mined in so brief a period. In the event of a national emergency, which might cut off present sources of supply in whole or in part, no solution is possible save through the accumulation in time of peace of a reserve of foreign ores sufficient to tide over the needs of the army and navy covering the period during which the normal avenues of trade may be closed or subjected to interference.

It is unlikely that a greater urgency to discover substitutes for manganese will ever be experienced than was the case during the World War. Germany, at the beginning of hostilities, whether by lucky accident or design, had stored within its borders exceptionally large quantities of manganese ore. Nevertheless, the unlooked for duration of the war forced German steelmakers to great lengths in locating materials to take the place of manganese. That no satisfactory solution was found is evident from the immediate resumption of the use of manganese as soon as the channels of trade had been reopened.

The hope that the beneficiation of the manganiferous iron ores and ferruginous manganese ores, whereby the metallic manganese content would be made available for the manufacture of high-grade steel, is a futile one in that the time element involved in making our known reserves of these ores available would be prohibitive. Limited independence of foreign

From a paper presented at the meeting of the Ohio Section of the American Institute of Mining and Metallurgical Engineers on "Manganese" at Cleveland, April 19. The author is a consulting engineer, New York, and past president of the institute.

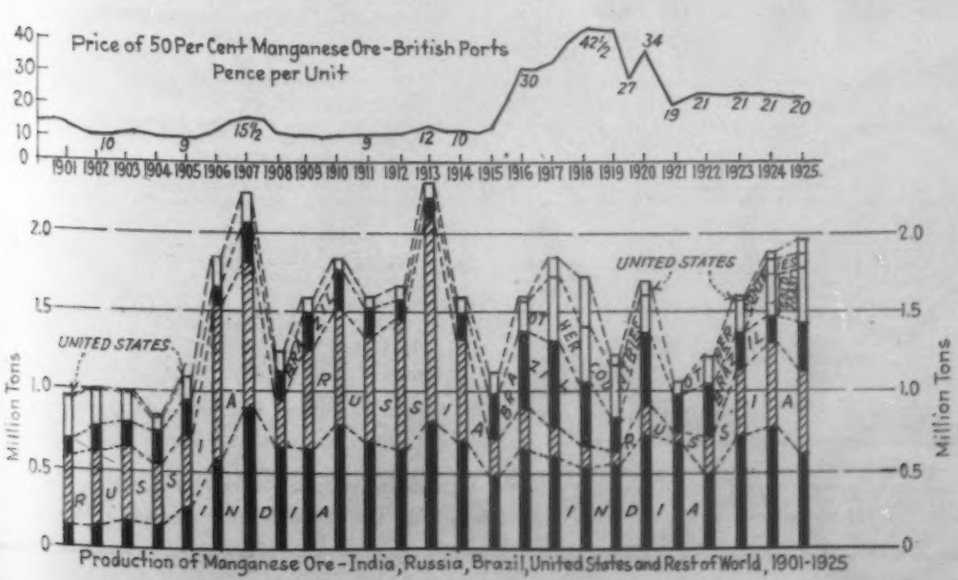


Fig. 1—Production of High-Grade Manganese Ore in India, Brazil, Russia, United States and the Rest of the World from 1901 to 1925 Inclusive

supplies might be attained provided a solution were found for the metallurgical problems involved in the treatment of the Montana rhodonite and rhodochrosite and the bementite of the Olympic Peninsula of Washington.

Ore Tariff Based on Erroneous Theory

The production of domestic manganese ore since the enactment of the tariff act of 1922 illustrates clearly and beyond dispute the erroneous theory upon which it was based. With the exception of a short interval represented by the years 1885 to 1890, when the Crimora mine was at the height of its production, the manufacturers of steel in the United States have had to depend upon foreign sources for at least 85 per cent of their needs. The exception to this statement is found in the production from domestic mines during the years of 1917 and 1918, when upward of 32 per cent of the country's requirements were supplied by domestic producers.

The fallacy of accepting this war-time production as indicative of the ability of domestic mines to supply the country's needs in times of peace is apparent when it is realized that, in order to utilize domestic production, requirements as to analysis of ores had to be greatly modified and domestic production was supplemented by the importation of more than twice as much high-grade Brazilian ore.

A study of Fig. 1 (a) indicates that in order to maintain the production attained in the early part of 1918 a material increase in price would have been necessary. It seems a fair inference that if the conditions existing in the latter part of 1918 had been prolonged for a period of, say six months, in spite of the importation from Brazil, modifications as to grade of steel produced would have been inevitable, and a repetition, in some degree, of Germany's experience of 1917 would have been the outcome.

During the campaign inaugurated by some of the war-time producers of manganese, which led up to the passage of the 1922 tariff act, the argument used was, in the main, "national defense," the theory being that in times of duress the industry could be rapidly expanded from a going concern thus reducing the time that would be necessary to develop our domestic resources. In other words, in the face of the well-known limited extent and adaptability of our reserves it was proposed to put a premium on their exhaustion on the plea of establishing an industry that would be readily at hand to function promptly in time of war.

The fallacy of this course of reasoning need scarcely be pointed out. Finally Congress was induced to enact a tariff in which the metallic content of manganese ore, in excess of 30 per cent, was made dutiable at 1c. per lb. and the manganese content in ferromanganese at 1⅞c. per lb. Broadly speaking, during the years since the passage of the tariff, the world's price of manganese ore c.i.f. Atlantic seaboard has been 40c. a unit or, on the basis of a 50 per cent ore, $20 a ton, to which must be added, before this material enters into domestic consumption, a duty of 1c. per lb., or $11.20 a ton, slightly in excess of 50 per cent. of its value in the world market.

Possibly the situation can be more tersely expressed by calling attention to the imports of high-grade manganese ore during the past year. In 1926, upward of 700,000 tons of metallurgical ore were imported. Meanwhile, the domestic production of metallurgical ore was but 22,400 tons, thus showing that only 3 per cent of the consumption was supplied by domestic mines. Congress in 1922 was led to believe that with the passage of the act referred to, the domestic mines would produce an appreciable amount of our needs, and might render us independent of foreign exports. In 1926, on the basis of the imports mentioned, nearly $8,000,000 was paid to the United States customs by the American consumers of manganese in order that the domestic production might be 22,400 tons; thus, in order to make possible the domestic production of 22,400 tons of manganese ore having a sales value of $31 per ton, duty included, the public at large was taxed to the extent of $360 per ton, an outlay of $10 to produce $1.

Reserves of Domestic Ore

Setting aside all other phases of the question, the seriousness of the situation may be appreciated by comparing the reserves as estimated by the sub-committee on manganese as existent in 1922 (Table II.) with a similar table published in the 1925 Chapter of the Mineral Resources of the United States, pages 178 to 181 inclusive. Since the passage of the tariff act, 146,209 tons of metallurgical ore have been produced, thus reducing the available supply to a new danger point.

Among the many problems that confront the War Department in connection with its requirements of raw materials in time of war, the question of safeguarding our manganese ore supplies is considered to be of the greatest importance. It is my impression that the recommendations suggested in the report of the sub-committee on manganese have been accepted. These recommendations are as follows:

> 1. The necessary appropriations should be provided for purchase in the open market, in equally yearly quantities over a period of from six to nine years, of a total quantity of not less than 600,000 tons of ferro ores, equal in grade to the accepted foreign standards; to be held in stock at a suitable location for tiding over a war emergency. This quantity is regarded as an irreducible minimum, being based on the assumptions that in the event of such emergency it will be supplemented by forced domestic production, and by the customary stocks privately owned by certain large steel companies.
>
> 2. The substitution of spiegel and high-manganese pig iron for ferromanganese, and the investigation of possible substitutes of manganese, should be fostered and encouraged by every educational means at the disposal of Government. The proper Governmental department should be instructed to undertake an organ-

(a) Report on Manganese for United States War Department. American Institute of Mining and Metallurgical Engineers' pamphlet published in 1924. (Report prepared by sub-committee on manganese, A. I. M. E. committee on industrial preparedness; see page 62, International Control of Minerals.)

Table I.—Manganese Alloys and Ore Produced in the United States and Imported from Principal Foreign Sources, 1917-1925, in Gross Tons

Year	Steel Production	Ferromanganese Shipments	Ferromanganese Imports	Spiegeleisen Shipments	Spiegeleisen Imports	Manganese Ore Domestic Shipments	Manganese Ore Total Imports	Imports from Russia	Imports from India	Imports from Brazil
1917.....	45,060,607	260,225	41,969	189,241	3,968	129,351	629,972	.....	48,975	512,517
1918.....	44,462,432	306,076	27,168	263,861	1,969	305,869	491,303	.....	29,275	345,877
1919.....	34,671,232	198,255	33,022	90,855	27	54,957	333,344	6,916	9,200	246,592
1920.....	42,132,934	276,594	59,254	103,672	5,234	94,420	*599,764	18,762	71,238	421,523
1921.....	19,783,797	111,374	9,077	69,230	307	13,531	*392,606	.....	113,730	262,468
1922.....	35,602,926	161,612	†100,725	70,253	8,151	13,404	†425,000	.....	24,250	234,598
								1,642	298	40,595
1923.....	44,943,696	226,365	†113,833	134,086	4,668	31,500	†419,000	‡11,670	‡25,568	‡88,036
1924.....	37,931,939	232,821	†56,588	76,179	7,433	56,515	†505,000	‡41,097	‡54,566	‡54,938
1925.....	45,393,524	254,005	†78,713	95,890	1,090	98,324	†615,000	‡114,537	‡23,504	‡103,650

*Exclusive of 7173 tons in 1920 and 8748 tons in 1921 reported by Bureau of Foreign and Domestic Commerce as manganese ore. The value of this "ore" ranged from $46 to $292 a ton; consequently the Bureau of Mines believes that the figures represent imports of ferromanganese, spiegeleisen, manganese chemicals, and perhaps some chemical ore.

†Prior to Sept. 22, 1922, the Bureau of Foreign and Domestic Commerce reported the gross weight of manganese ore and ferromanganese imported, but since that date has reported only the manganese content. This figure is a Bureau of Mines estimate of the gross weight of ore or alloy imported.

‡Figures represent manganese content of ore imported from Russia, India and Brazil in 1923, 1924 and 1925.

ized campaign in this direction, the necessary funds being provided; not only for the purpose of investigations and demonstration, but also for gathering and disseminating information. An experienced practical metallurgist should be in charge of this work, who should at all times keep his finger on the pulse of the country's requirements.

3. Government experts, with the necessary funds at their disposal, should be required to maintain a perpetual inventory of all domestic manganese resources of whatever grade, at the same time keeping in active touch with foreign sources and developments. This work must go further than a simple estimate of reserves in the ground; full information being constantly sought bearing on stocks in hand, the availability of reserves, the probable acceleration of domestic output in an emergency, the price that would be needed to bring it out quickly, the amounts that could be looked for, and so on; to the end that the domestic situation may at any time be appraised quickly and with reasonable accuracy, not only as to requirements, but also as to resources.

4. Artificial stimuli in times of peace, which, if effective, will simply tend to deplete an already extremely limited reserve of ferro-grade and chemical ore, should be strongly discouraged.

While we regard all the above recommendations as of the greatest importance, considering that no one of them should be overlooked, we desire to call your particular attention to the first.

Table II.—Indicated Total Reasonably Possible Reserves of Manganese Ore of Ferro Grade (35 Per Cent or More of Manganese), at an Index Price of $50 a Ton, in Gross Tons, by States

State	Crude, Maximum	Concentrate, Maximum	Total, Maximum	Recoverable Manganese, Maximum
Alabama	.....	10,000	10,000	4,500
Arizona	80,000	20,000	100,000	45,000
Arkansas:				
Batesville	210,000	165,000	375,000	174,300
Western	1,000	.....	1,000	500
	211,000	165,000	376,000	174,800
California	160,000	.....	160,000	64,000
Colorado	250,000	.....	250,000	87,500
Georgia	.....	200,000	200,000	84,000
Montana:				
Butte, carbonate	450,000	.....	450,000	162,000
Butte, low-grade	.....	125,000	125,000	52,500
Philipsburg	315,000	140,000	455,000	182,000
Others	400	.....	400	150
	765,400	265,000	1,030,400	396,650
Nevada	30,000	.....	30,000	12,000
New Mexico	20,000	.....	20,000	8,000
Oregon	2,000	50,000	52,000	20,800
Tennessee	5,000	55,000	60,000	22,800
Utah	12,000	.....	12,000	5,400
Virginia	.....	1,000,000	1,000,000	420,000
Others*	10,000	.....	10,000	4,200
	1,545,000	1,765,000	3,310,400	1,349,650
Chemical ore	315,000	.....	315,000	126,000
	1,230,400†	1,765,000	2,995,400	1,223,650

*Idaho, Maryland, New Jersey, North Carolina, Oklahoma, Texas, Wyoming.

†Minimum crude is placed at 660,500 tons; concentrate at 739,000 tons, total at 1,399,500 tons, and recoverable manganese at 578,510 tons.

Repeal Tariff on Manganese Ore

It is obvious that the existing tariff on manganese should be repealed. It fosters no industry and depletes our too scanty reserves of this essential raw material. A burden of $8,000,000 placed upon the nation's industry in order to force the production of manganese ore to the extent of only $600,000 requires no argument to demonstrate its absurdity.

On the contrary the United States Government, in line with the recommendations of the "Committee on Industrial Preparedness" should accumulate over a period of years such a stock of manganese ore, of standard grade and analysis, as will meet the needs of the war and navy departments in the event that the national security at any time should be placed in jeopardy.

Such a reserve of ore acquired gradually would not in any way affect the world markets and its value in the course of time will increase rather than diminish, in which respect it differs from investments in battleships which become obsolete in less than a decade. The market value of the entire manganese ore supply which the committee recommended be acquired in from 6 to 9 years is $12,000,000, or but a fraction of the cost of a single capital ship. Its effect would be to safeguard the quality of all steel that might be needed in a period of emergency lasting 1 or 2 years.

An Ingenious Plan Suggested

An ingenious plan has been suggested for acquiring a Government supply of manganese ore by requiring that the import duty be partly paid "in kind," in other words, that for every ton of ore brought in a certain percentage be turned over to the Government and stocked on Government reservations or held in Government warehouses in convenient relation to points of ultimate consumption, the necessary equipment and personnel being furnished by the army and navy. The present rate of import duty, being approximately 50 per cent., would result in too sudden an acquisition of the needed reserves, but a moderate rate of 10 per cent of the imported tonnage would not disturb the market and would result in the accumulation of a safe ore supply in the course of 10 years.

This would constitute a "painless" way of meeting the situation as far as the war and navy departments are concerned. It would not cure the evil inherent in an import duty so indefensible and opposed to the public interest as that now in effect on manganese ore.

The executive departments of our Government are debarred from instigating or attempting to influence legislation. The military branches may submit recommendations but are not permitted to urge the necessary legislation to carry out such recommendations except through very narrow and well defined channels.

It would, therefore, seem to devolve upon the public, of which the American Institute of Mining and Metallurgical Engineers forms a modest part, to give consideration to the able and thorough report of the sub-committee on manganese and to assist as far as possible in carrying into execution its recommendations, which were the result of so much investigation and research carried on in a spirit of disinterested patriotism.

Magnetic Reluctivity Relationship

Scientific Paper No. 546 of the United States Bureau of Standards covers an experimental and theoretical study of the magnetic properties of pure iron near saturation. It was written by Raymond L. Sanford, physicist of the bureau, and copies may be obtained of the Superintendent of Documents, Government Printing Office, Washington, at 5c. each. The conclusion is reached that the so-called reluctivity relationship does not truly represent the properties of pure and homogeneous materials. The contestants in the reluctivity equations of the Kennelly formula are believed to be without physical significance. This makes it more difficult to correlate the magnetic properties of materials with their other physical properties.

In cooperation with the Pittsburgh Experiment Station of the United States Bureau of Mines, eight research fellowships in mining and metallurgy are offered by the Carnegie Institute of Technology during the coming year. According to the announcement, the fellowships are open to the graduates of colleges, universities and technical schools who are properly qualified to undertake research investigations. Each fellowship carries a stipend of $750 paid in ten monthly installments. The period of each fellowship will be from Aug. 15, 1927, to June 15, 1928. The purpose of these fellowships, it is announced, is the solution of problems which are of special importance to the mining, metallurgical and allied industries. Application blanks for fellowship appointments can be secured by writing the Secretary, Mining and Metallurgical Advisory Boards, Carnegie Institute of Technology, Pittsburgh, Pa.

Steel-making Costs Steadily Lower

President Grace Shows That With Wages More Than Doubled, and Freights Up 90 Per Cent, Steel Prices Have Advanced Much Less Than the Average of All Products

ECONOMIC problems of the steel industry were discussed by Eugene G. Grace, president Bethlehem Steel Corporation, in an address made at a noonday luncheon meeting in the Public Auditorium, Cleveland, April 14, attended by 3000 business men. At the speakers' table were leading executives of iron and steel companies of Cleveland and other northern Ohio cities. Among the speaker's striking utterances were these relating to prices and salesmanship which followed his review of developments in the steel industry in the past few years:

I stand for large production and low prices, but not ruinous prices. The prices obtaining for steel products all too frequently are neither based upon investment and service nor justified by costs. Inadequate prices do not inure to the benefit of the public and in the long run are harmful alike to the employee and to the industry. Disastrous prices and ridiculous price instability benefit nobody. Order grabbing regardless, or a mad rush in slashing prices at the first indication, real or fancied, of softening in business is not salesmanship.

Fundamentally the steel industry is sound. Its future was never more promising. Its prosperity rests very largely upon the quality of the stewardship of those responsible for its management. I have full confidence that management will perform effectively and that steel will continue indefinitely in contributing its full share not only to industrial progress but to the maintenance, development and progress of our civilization.

How Wages Have Advanced

Mr. Grace pointed out that four classes of people are affected by the economic problems of the steel industry. They are the employees, the customers, the investors in securities and the general public, and he discussed the industry from the standpoint of each class. In considering first the employees, he said that the average yearly wages of the employees of the Bethelehem company had increased from $876 in 1914 to $1,821 in 1926, a gain of 108 per cent in 13 years in spite of the reduction of the working time due to elimination in that period of the 12-hr. day and to a large extent of the 7-day week. The increase in earnings of the company's employees was from 21.7 cents per hr. in 1914 to 64.8 cents in 1926, or nearly 200 per cent. The average wages paid in the steel industry in 1926 exceeded those paid in any other of 20 major manufacturing industries and are approximately 30 per cent above the average of the entire group, according to statistics prepared by the National Industrial Conference Board.

During the 13-year period the cost of living increased 75 per cent as compared with the 108 per cent wage increase. Consequently the economic condition of the steel plant employee has been greatly improved. Commenting on the increased buying power and better standards of living, Mr. Grace said:

"I think it is generally recognized today that one of the most important factors contributing to the general prosperity of our country has been the increased purchasing power of our population, and I take it to be fundamental that the continuance of this general prosperity depends upon the maintenance of this purchasing power and that any increase in the purchasing power of various groups, especially those whose incomes are now below the average, will do much to stimulate further general trade activity. The last three years have conclusively demonstrated that good times and high wages are twin brothers. For this reason I feel that the management of the steel industry has just cause for pride in its contribution to our general prosperity through payment of liberal wages, and I sincerely hope that nothing will arise to interfere with a continuance of this policy."

Steel Prices Relatively Low

Taking up the customer's interests in the economics of the steel industry, Mr. Grace stated that since 1913 the average prices of steel products have increased 35 per cent as compared with an average increase of 51 per cent in the prices of all commodities. He pointed out that the lower percentage in the cost of making steel as compared with other commodities was accomplished in spite of higher wages and the sharp advance in freight rates.

"Bear in mind," he said, "that, aside from wages, the largest element of cost in making steel is freight and that this element affects steel far more in proportion than any other commodity because of the fact that approximately five tons of raw material must be transported and assembled at the plants in order to produce one ton of finished steel products. Between 1913 and 1926 the average increase in railroad freight rates in this country was 90 per cent, and this increase applied to the five tons of raw materials per ton of steel has resulted in pyramiding this element of cost for our industry far more than for any other.

"Yet in spite of these increases in the elemental costs of making steel (200 per cent in the hourly rates of wages and 90 per cent in the cost of freight) the average price of steel products has increased much less than the general level of prices of other commodities.

"Naturally we ask, what is the explanation of this seemingly extraordinary condition? It is two-fold, (1) the steel industry has received a smaller margin of profit for its products, and (2) the manufacturing costs in the steel industry, exclusive of freight and wages, have been very substantially reduced by increasing the productive power of labor as a result of the development of new and improved processes, the installation of new and modern equipment, the construction of new units, and the specialization of plants for large scale production of certain products."

Nearly Two Billions in Plant Improvements

The cost of steel plant improvements from 1914 to 1926, inclusive, Mr. Grace estimated, has been $1,650,000,000. As a result of this huge expenditure consumers have been able to buy their steel at much less than they would otherwise have had to pay and in this way the steel industry has made another important contribution to the general prosperity of the country. In spite of the large expenditures necessary to bring about these savings in the cost of production the industry has received approximately the same margin of profit for its steel as it did before the expenditures were made. In 1913 the earnings available for interest and dividends of the 10 largest steel companies were equal to $6.13 per ton of ingots produced as compared with an average of $6.21 for the three-year period, 1924, 1925 and 1926, and with $6.69 per ton in the latter year, the record year in point of production. Based on the returns of the 10 largest companies in the steel industry representing approximately 80 per cent of the capacity the figures show, Mr. Grace said, that the average return on the investment in 1925 was 5.51 per cent. He presented figures showing that the rate of return on investment of the steel industry is below nearly all other leading industries.

Turning to the industry from the standpoint of the investors, Mr. Grace stated that there has been invested in the steel industry of this country close to $4,750,-

000,000, which has been provided either through the sale of securities to the investing public or through the application of earnings put back in the business for improvements and extensions. The net increase in this investment during the last 13 years, after deducting all charges for depreciation, amortization, etc., is more than $1,300,000,000, or an average of over $100,000,000 per year. Most of this increase represents expenditures for improvements and extensions, but the larger volume of business and higher level of all prices have required a substantial increase in working capital during the same period. The figures, he said, represent an actual investment in the industry and do not reflect the tremendous increase in the present-day value of plants and properties due to the general increase in the cost of construction. This is a factor which is generally recognized as proper to be considered in the valuation of railroad properties and public utilities which are subject to regulation. If the same basis of valuation were applied to the steel industry, the present-day value based on cost of reproduction less depreciation of the plants together with working capital can be conservatively estimated at $6,000,000,000. "Has this huge investment been justified by the results?" he asked.

Rates of Return Low

Discussing the return on investments, Mr. Grace stated that on each $100 actually invested in the steel industry during the past three years, the earnings were approximately $4.91, $5.51 and $6.64, respectively, the average for the three years being $5.70. These rates of return are based upon actual investment and not upon the present fair value of plant and property. He estimated that the return on the present-day value of the investment was equivalent to 3.80 per cent in 1924, 4.37 per cent in 1925 and 5.33 per cent in 1926, or an average of 4.73 per cent for the three years.

Making comparison of the steel and automobile industry he pointed out that the United States Steel Corporation in 1926, with a capitalization including surplus of about $2,185,000,000, earned $143,000,000, and that the General Motors Corporation, with a capitalization of $637,000,000, earned $186,000,000. The net return of the Steel Corporation was $6.54 for each $100 of capitalization while that of the General Motors Corporation was approximately $29.20.

Mr. Grace declared that the figures of return to investors in the steel industry indicate that the industry has failed to appreciate fully the diminishing rate of return on investments and that in some quarters the interest of the holders of steel plant securities has not been given the consideration it deserves. In this connection he pointed out that steel company securities are now held by hundreds of thousands of small investors and he stressed the importance from the viewpoint of general prosperity, of earning and paying to holders of steel plant securities a rate comparable to what they could receive in other industries.

More Adequate Return Essential

"If it is important," he added, "and I think you all agree that it is, to maintain the high purchasing power of our labor and our customers, I think you will also agree that it is equally important to maintain the purchasing power of the average investor. Furthermore, it is essential that the steel industry earn a more adequate return upon its investment if it is to provide additional improvements and extensions to supply the ever-growing requirements of this country for steel and at the same time to take advantage of developments in the art which will further reduce the cost of making steel and inure to the benefit of its customers."

Mr. Grace declared that if the country is to attain its maximum degree of prosperity there should be at least normal prosperity in every industry and a profitable steel industry is essential to national prosperity. That is the interest of the fourth class, the general public, in the economic problems of the steel industry.

Methods of mining iron ore and the various manufacturing processes of pig iron and finished steel were shown in moving pictures through the courtesy of the American Steel & Wire Co.

The meeting was the fourth of a series of four depicting Cleveland's industries, which was sponsored by the Industrial Development Committee of the Cleveland Chamber of Commerce. H. G. Dalton of Pickands, Mather & Co. was chairman of the committee in charge of the iron and steel meetings.

New York Steel Treaters Discuss Die Blocks

The film, "The Story of the Die Block," was the feature of the April meeting of the New York chapter of the American Society for Steel Treating, held Monday evening, April 18, in the assembly room of the Merchants' Association, Woolworth Building. It was presented through the courtesy of the Heppenstall Forge Co. Bridgeport, Conn., and during its presentation, points of special interest were discussed from the platform. At the May meeting, on May 16, A. V. De Forrest will lecture on "Magnetics and Steel Treating," demonstrating the latest developments in this field.

Other Chapter Meetings

The Cincinnati chapter of the American Society for Steel Treating was addressed at its regular April meeting on Thursday evening, April 7, by William P. Sykes, metallurgist Cleveland Wire Division of the General Electric Co., and chairman of the Cleveland chapter, on "Hardening Iron Without Carbon." Mr. Sykes is the discoverer of the hardenable iron-tungsten and iron-molybdenum alloys which retain their hardness at temperatures at which high-speed steel rapidly softens.

At the April meeting of the Hartford chapter of the American Society for Steel Treating, Tuesday evening, April 12, Stanley P. Rockwell, inventor of the Rockwell hardness tester, delivered an address entitled "The Rockwell Dilatometer and the Volcrit Method of Heat Treatment."

"Metallurgical Control in a Plant Manufacturing Machinery, Small Tools, Gages and Aircraft Motors" was the subject of an address by A. H. D'Arcambal, Pratt & Whitney Co., Hartford, Conn. For the May meeting, Dr. John A. Mathews is announced as the principal speaker.

Conference on Leadership and Its Development

"What Is Leadership" and "How Are Leaders Being Developed" are two of the topics to be discussed at the Washington Conference of the Personnel Research Federation and the spring meeting of the Taylor Society, to be held jointly in Washington, May 9 and 10. Sessions will be held at the National Research Council, Twenty-first and B Streets, and the headquarters will be at the Hotel Powhatan.

Definition and analysis of the topic "What Is Leadership?" will be made by Ordway Tead, of the New York School of Social Work, at the opening session. "Traits Common In All Situations" will be the subject of a paper by W. C. Cowley of the University of Chicago, and another paper, by Gen. M. B. Stewart, superintendent of the West Point Military Academy, will be on "The Army's Contribution to the Understanding of Leadership and Its Development."

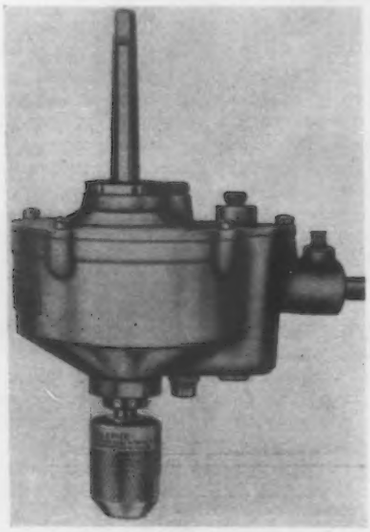
A symposium on "How Are Leaders Being Developed?" is planned for the afternoon session, May 9, at which Morris L. Cooke, consulting engineer, Philadelphia, and president of the Taylor Society, will preside. Among those taking part in the discussion will be M. J. Kane, engineering department of the American Telephone & Telegraph Co., and Bert M. Jewell of the American Federation of Labor. This session will be followed by a dinner meeting at which the Hon. Herbert Hoover, Secretary of the Department of Commerce, is expected to preside.

"Measuring Morale and Leadership Ability," will be discussed at the opening session of the second day. Howard Coonley, president of the Walworth Co., Boston, and president of the Personnel Research Federation, will be chairman and the speakers include H. J. McCorkle of the White Motor Co. There will also be a session on research.

High-Speed Sensitive Tapping Attachment

A high-speed sensitive tapping attachment designated as the Ettco No. 2, with capacity up to ⅜ in., has been added to the line of the Eastern Tube & Tool Co., Inc., 594 Johnson Avenue, Brooklyn, N. Y.

Together with high speed of the spindle, sensitive tapping without adjustment is a feature stressed for this tool. The leather-lined cone clutch and cast-iron driving cones of the device are said to effectively prevent tap breakage. If a tap sticks or hits the bottom of the hole, the clutch slips, and if the tap sticks in backing out, the reverse cone slips. Reverse is at



If a Tap Sticks or Hits the Bottom of the Hole the Clutch Slips. Reverse of the tap is at twice the forward speed

twice the forward speed. By locking the threaded Morse shank in the tapper, left-hand threads may be tapped. The lost play in the chuck spindle is said to be only 1/16 in. The tool has an aluminum case and light alloy steel parts, which materially reduce the weight.

Lateral float is imparted to the leather-lined cone clutch by an Oldham coupling attached to the chuck spindle. This takes up unevenness of the leather and inaccuracies of the parts, and it is claimed that there is no binding. It is stated that with this patented feature the tap would run true and could be driven into the work, even if the case and gears were removed. The thrust is taken by the spindle of the drill press. The case and gears are for reversing. All journals are hardened and ground, and run in phosphor or Tobin bronze. Two oil holes are provided for lubrication of the attachment.

Compression Grease Cups With Alemite or Zerk Fittings

Malleable-iron compression grease cups with Alemite or Zerk fittings are being offered by the Link-Belt Co., 910 South Michigan Avenue, Chicago. These

Grease Cup with Industrial Alemite and Zerk Fittings Is at the Left and Right, Respectively

cups, named Hex-Top, have a six-sided head, which is intended to provide a purchase for wrenches and a good grip for the hand.

These cups are designed to hold a suitable reserve for use of the compression feature and it is claimed that only an occasional slight screwing down by hand or by means of a wrench is necessary until it is time to have a general refilling of the cups. It is stated that if a bearing gets warm when the grease gun is not at hand a few turns of the cap will take care of the emergency. These cups may be filled conveniently even in inaccessible places.

Electrically-Driven Hand Saw of Light Weight

A new electrically-driven hand saw or light weight, an outstanding feature of which is that the saw is mounted directly on the motor armature, has been placed on the market by the Porter-Cable Machine Co., Syracuse.

The motor armature runs in two ball bearings, which are packed in grease. With this arrangement the full power of the motor is applied direct to saw and the use of gears, couplings and extra spindles is eliminated. The machine, which weighs only 10 lb., may be operated with one hand, thus allowing the other hand to support the work.

A wide supporting shoe, provided for carrying the weight of the tool, prevents tipping and assures square cuts. The front of the shoe is graduated in increments of ¼ in., and this edge permits the operator to follow a line in cutting. The opposite edge which is parallel to saw, permits the use a miter gage. By loosening front handle, the hinged supporting shoe may be set conveniently for any depth of cut up to 2 in., which feature adapts the saw for cutting out sections of flooring without injuring sleepers. It may also be used for removing the projecting ends of siding, roofing

The Saw Is Mounted Directly on the Motor Armature. The weight of the machine is only 10 lb.

and flooring and is claimed to save hand labor in pattern shops, shipping rooms and carpenter shops.

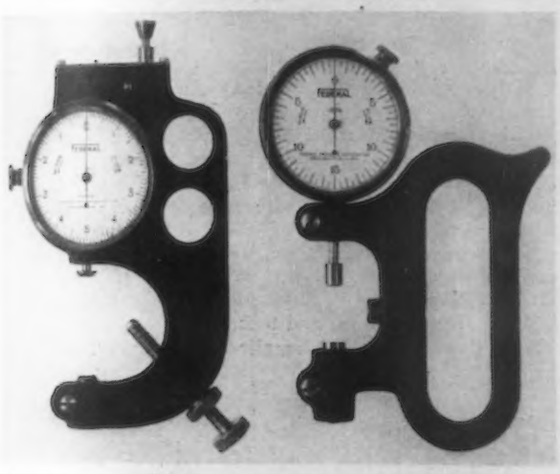
The parts of the saw are, for the most part, of aluminum and Duralumin. The ventilation of motor is protected, and exhaust of air is inside of the guard, which blows sawdust away from work and operator. The saw blade is guarded. Standard equipment includes 10 ft. rubber covered conductor cable and armored duplex plug, and one 7-in. combination saw which may be used for both ripping and cross cutting. Hollow ground saws for particularly smooth cutting, and special saws, as well as miter gages and grinding attachments, can be furnished. The machine is named the Kwicksaw.

Lehigh University's curriculum in mining engineering at Bethlehem, Pa., is the subject of a new 16-page pamphlet. It outlines the elements of mining engineering and gives an idea of the problems involved and of the character of preparation which Lehigh University has found to be the best training for undergraduates. The equipment of the Coxe Mining Laboratory is described, together with an outline of methods of instruction. Inspection trips, generally taken in the summer, are made by students to the mines of northeastern United States and southern Canada.

Dial Gages for Measuring Cylindrical Stock

Two new thickness gages designed originally by the Federal Products Corporation, Providence, for measuring the diameters of camshafts and crankshafts, but are adapted also for measuring wrist-pins, bushings and other cylindrical pieces are shown in the accompanying illustrations. They can be furnished to take any diameter of stock from 0 to 2 in. and adjustable lower anvils are supplied when the gages are to be used to measure a variety of sizes greater than the range of the indicator. Watch type construction is employed to assure close accuracy of measurements.

These new models can be equipped with several



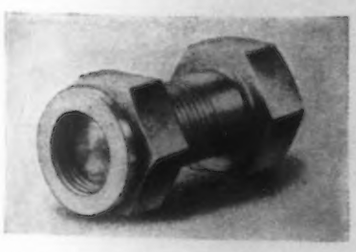
Jaws Can Be Furnished to Take Stock Up to 2 In. in Diameter

different types of indicators. The gage shown at the left, designated as the model No. 260, is equipped with an indicator graduated in 0.0001 in. and that at the right, the No. 264, has an indicator graduated in 0.0005 in.

One-Piece Locknuts

One-piece "Crown" locknuts which are claimed to hold securely at any place on bolts without the use of second nuts, lock washers or cotter pins, are being marketed by the Barty Axle Corporation, Syracuse, N. Y.

This locknut, shown in the illustration, is made from blanks which have an annular groove near one end.



Second Nuts, Lock Washers Or Pins Are Not Used

The blanks are threaded in the usual way and then placed in punch presses and compressed a few thousandths of an inch, which brings the threads on each side of the annular groove closer together so that they frictionally lock on the threads of the bolt.

For approximately three-quarters of their length the "Crown" nuts turn on the bolts without resistance, and are brought to their final holding position by means of a wrench or a pneumatic tool. It is claimed that the nuts may be removed from and put on a bolt many times before losing their locking efficiency.

The physical properties of various alloy castings produced by the Sivyer Steel Casting Co., Milwaukee, including chromium, nickel, vanadium, manganese, chrome-nickel, as well as high-carbon steels, are discussed in an attractive booklet issued by the company for general distribution.

Safety Features Claimed for Venturi Suction Torch

Safety features are stressed in connection with the Venturi suction torch here illustrated, several sizes of which are made by the Hauck Mfg. Co., 126 Tenth Street, Brooklyn, N. Y. It is claimed that in this torch the oil cannot get out of control, because when the suction ceases the oil flow stops instantly.

Other safety features include a double wire gauze screen in the filler connection to prevent ignition of the oil or gases in the tank and a ball check in the filler cap to seal the tank when the latter is tilted or upset. The oil line and the air line are of high grade rubber, and the tank is of seamless drawn steel, with all connections welded or brazed. The burner is of sheet steel and pipe and the nozzle is of cast iron. It is light in weight, which facilitates the handling, and may be dismantled conveniently for cleaning.

In lighting the burner the oil valve is opened three or four turns and burning waste or paper or a wick torch is held beneath the nozzle. The air cock is then opened gradually and when the proper oil and air mixture is obtained, the burner ignites instantly. Preheating or occasional warming is unnecessary. The flame is said to burn steadily without pulsations and to heat uniformly. The torch can be operated 14 ft.

Oil Is Pulled to the Burner by Suction, and the Flow Stops if the Oil or the Air Line Should Be Cut

above the level in the tank. The range of the flame is wide and the size of it can be controlled by the manipulation of the air cock only.

Fuel oil as heavy as 28 deg. Beaume and all the lighter oils and distillates may be used in operating this torch and only the usual air pressure of 50 to 100 lb. per sq. in. is required. Six sizes, with tank capacity ranging from 5 to 20 gal., are available. The two smaller sizes are arranged for portable use and the four larger sizes are mounted on wheels as shown in the illustration.

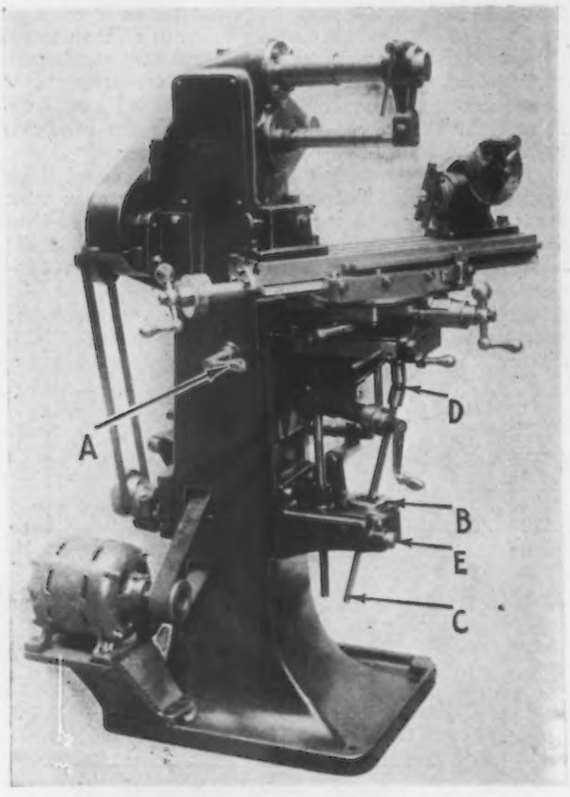
1001 Alloy Formulas

Manufacture, properties and industrial applications of 1001 alloys are covered in a 64-page pocket-size booklet under the title "1001 Alloy Formulas," prepared by Ernest G. Jarvis and being distributed by the Niagara Falls Smelting & Refining Co., Buffalo. The text takes up the principal characteristics of the main alloying metals and then goes into details with regard to alloys made from them. In the latter part of the work is an alphabetical table, with reference symbols, covering the long list of alloys.

Small Universal Miller for Production or Light Tool-Room Work

The Artisan Mfg. Co., 869 Hathaway Street, Cincinnati, has placed on the market a small universal milling machine having a table travel of 14 in., cross-travel 5 in. and knee elevation of 11 in. It is intended for light manufacturing and tool room work.

The machine has a self-contained countershaft on the right-hand side and a single friction-clutch pulley



The Machine Has a Table Travel of 14 In., Cross Travel of 5 In. and Knee Elevation of 11 In. The driving motor is of ½ hp.

which also serves as a brake. When belt-driven, power is transmitted directly to the friction-clutch pulley from the drive pulley on the lineshaft. When motor-driven, a ½-hp. motor is mounted on a bracket bolted to the column base, as shown, and the motor-belt passes through openings in the column to the friction-clutch pulley. Handle *A* controls the friction clutch and brake. A three-step cone-pulley attached to the countershaft transmits power to another cone-pulley on the jack-shaft. The latter rotates more than twice as fast as the spindle at all times. This jack-shaft is offset from the spindle and runs in bronze bearings. A sliding back-gear provides six spindle-speeds ranging from 21 to 500 r.p.m.

A feed gear on the rear end of the spindle operates through a reverse-plate thus providing power-feed to the table in either direction. Six feeds ranging from 0.00075 to 0.024 in. per revolution of the spindle are obtainable. The feed belt drives a lower feed cone pulley which drives shaft *E*. This shaft passes through the column and carries a steel worm which engages worm-wheel *B*. The feed shaft is universally driven by the worm-wheel, and the upper half of universal joint *D* is provided with a snap-socket so that it can be readily attached for driving either the table or the cross-feed. The illustration shows the cross-feed in use.

The table has a working surface of 6 x 18 in. and may be swiveled to a 45 deg. angle. The table-feed screw is arranged to receive change-gears for driving a dividing-head, and self-locking micrometer dials, graduated in thousandths, are provided for table, saddle and knee adjustments. The machine, without motor, weighs 650 lb.

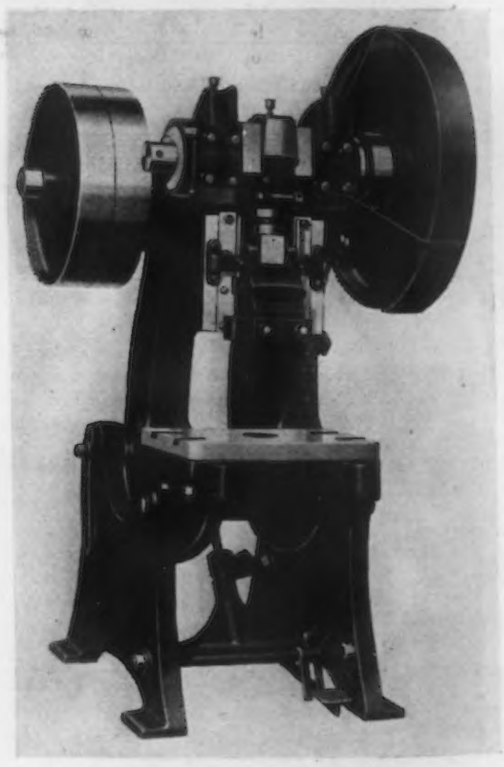
Announces Line of Open-Back Inclinable Presses

Announcement has been made by the Marshalltown Mfg. Co., Marshalltown, Iowa, of a new line of open-back inclinable power presses which are available in five sizes, Nos. 1 to 5 inclusive, of the flywheel type and Nos. 3 to 5 inclusive, of the geared type.

The machines are of standard design and are arranged with ample die space to permit the use of leaderpin die sets, and sub-dies. On all sizes the shafts are extended to permit of attaching a crank for any type of automatic feed. The bar knockout in the slide is of rugged construction and the clutch is of simple design with all parts of generous size to assure long life. A ball and socket is employed, this being claimed to carry a greater pressure area and to be always snug and tight. In designing the frame or body of the press, consideration was given to the distribution of the metal, so that all sizes of the machines would have ample strength.

Specifications for the No. 1 and the No. 5 flywheel type machines, respectively, are as follows: Diameter of crankshaft at bearings and crankpin, 1¾ x 1⅞ in. and 3¾ x 4 in.; standard stroke of slide, 2 in. and 3 in.; maximum stroke of slide, 3 in. and 5½ in.; adjustment of slide, 1¼ in. and 3 in.; distance from bed to slide, stroke down adjustment up, standard stroke, 6¾ in. and 10 1/8 in.; depth of throat, center of slide to frame, 3⅞ in. and 9 in.

The flywheel on the smallest and largest sizes is 20 x 3 in. and 36½ x 6¼ in., respectively, and the

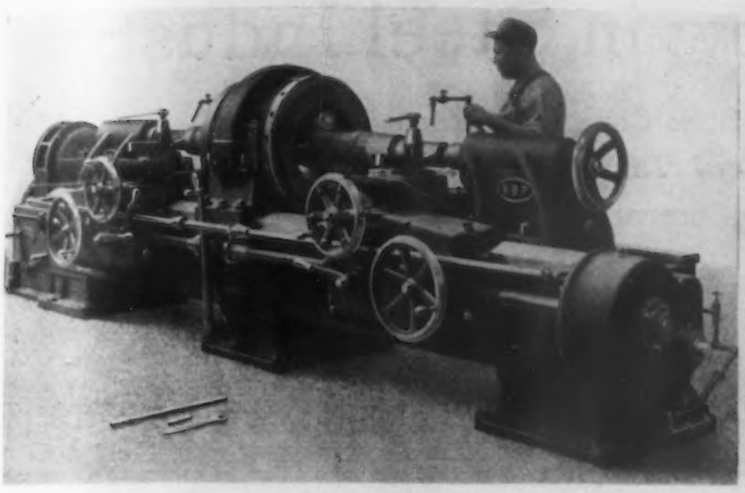


Five Sizes of the Flywheel and Three of the Geared Type Are Available

weight of the flywheel is 165 lb. and 930 lb., respectively. The floor space occupied by the legs is 20½ in. x 23¼ in. and 35½ in. x 43 in. The height from the floor to the top of the flywheel is 64 in. and 7 ft., 4¾ in., respectively. The weight of the smallest and largest machines complete, is 800 lb. and 5200 lb., respectively. A 1-hp., 900-r.p.m. motor is used for the smallest machine and a 5-hp., 900-r.p.m. motor for the largest.

"Stress-Strain-Cycle Relationship and Corrosion-Fatigue of Metals," by Dr. D. J. McAdam, Jr., is the title of a 40-page pamphlet reprinted from the proceedings of the American Society for Testing Materials, Philadelphia.

The Equalizing Head Is For Use in Place of the Regular Driving Plate and Dog. The tool holder shown in the close-up view, carries four tools.



Axle Lathe With New Equalizing Driving Head and Multiple Tool Holder

Two improved features—an equalizing driving head and a multiple tool holder—are being offered by the Niles Tool Works Co., division of the Niles-Bement-Pond Co., 111 Broadway, New York, as optional equipment for its No. 3 double axle lathe. The new features are intended to add to the operating convenience and productive capacity of the machine for which they were designed.

The equalizing head, shown in the full view illustration, is for use in place of the regular driving plate and driver dog. It consists of a spool upon which is mounted an internal gear ring, the outside of the latter having equally spaced radial pin holes. There are three serrated driving dogs the heel of each of which has a segment of a gear cut on it. These gear segments mesh with the internal gear ring. Each dog swings on a pivot and is held in engagement with the axle by means of a spring. The arrangement is such that when the dog is in contact with the axle and the machine is started up, the pressure of the cut increases the grip of the dog and prevents any slip. An equalizing feature in these drivers takes care of eccentricity or roughness in the axle forging without distorting the axle, each dog taking its equal share of the load.

To release the dogs a pinch bar is inserted into one of the radial pin holes and the gear ring given a part turn which opens the jaws. Provision is made so that the jaws may be held open for removing or inserting axles. Axles up to the full capacity of the machine can be driven by means of this driver with the one set of jaws.

The multiple tool holder, shown in the close-up illustration, carries four tools. Each tool is shaped and spaced to perform its specific operation on the collar, journal, dust guard and wheel seat with a minimum of movement of the carriage. The tools are arranged so that they may be withdrawn for sharpening and re-inserted without destroying their positions relative to each other.

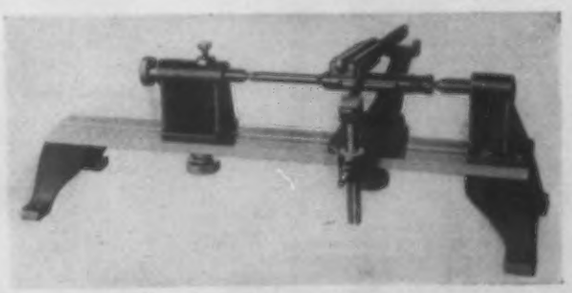
Device for Sharpening Straight-Bladed Reamers

Quick set-up and simplicity of operation are claimed for the reamer sharpener here illustrated, which is obtainable from the Foster-Johnson Reamer Co., Elkhart, Ind. The device is designed for the honing of straight-bladed reamers having centers in the ends and which are 16 in. long and less, and 5 in. and under in diameter.

In operating the device, the reamer to be sharpened is mounted between the headstock and footstock centers, as shown, and the spring tooth rest positioned so that the spring tooth points toward the face of the reamer blade. The spring tooth is then adjusted so that it will be a little below the cutting edge of the blade, after which the tooth rest is locked in position by means of a binding screw.

The handle which carries the sharpening stone is then placed in the support arm and the stone is laid on the reamer blade that is set against the spring tooth. The supporting arm is adjusted up or down until the surface of the stone conforms to the angle of the reamer blade. When the adjustment is completed and the stone is in position to cut across the full face of the blade, the supporting arm is locked in position by means of the knurled locking nut. The finger supporting the blade and the rest for guiding the hone are adjustable to any clearance angle.

With his left hand holding the reamer blade against the spring tooth and his right hand on the handle, the operator rubs the stone across the top of the reamer blade. To hone another blade the reamer is twisted with the left hand and the next tooth of the tool brought into contact with the spring tooth of the device. A few strokes are taken on each blade until the reamer is fully sharpened. It is claimed that the blades cannot be burned and no more metal than necessary



The Reamer Is Mounted Between Centers and Is Sharpened by Means of a Hone

to obtain a sharp edge is removed. It is further stated that the reamers cut better because proper clearance can be maintained back from the cutting edge on all blades.

The National Machine Tool Builders' Association may undertake a research investigation among its members to determine the results obtained from the use of paints on machine tools. Members of the association have been invited to tell the association what their experiences have been.

Profits Low in Steel Industry

Forty Iron and Steel Companies Earned 7.18 Per Cent on Stockholders' Value in 1926, While 106 Metal Consuming Companies Earned 14.54 Per Cent

ALTHOUGH 40 iron and steel companies last year showed a profit of 7.18 per cent on the total stockholders' value, which upon first glance may seem to be a fair return, 106 companies which are largely dependent upon the iron and steel industry for their raw materials were able to earn 14.54 per cent on a stockholders' value of $3,696,982,235 and net profits of $573,796,177, or more than twice the return of the iron and steel business.

This large return was not, as the accompanying tables show, due to the phenomenal prosperity of any single one of the metal consuming industries. The automotive group did show an unusually high return, due largely to the profits of the General Motors Corporation and a few of the other large automobile companies. But other groups were also able to show large profits, which even though not so high comparatively as the automotive group were well above the profits of the steel companies. Machine tool builders alone, with a profit of 3.07 per cent on stockholders' value, made a poorer showing than the makers of iron and steel. The railroad equipment builders and the makers of farm implements proved to be farther up the scale of profit making than generally believed.

In the steel business, the return of 7.18 per cent compares with the 5.90 per cent earned last year by 42 companies, but the figures for both years are to be taken in the light of the high production rates realized, which ought to show well if profits are ever to be earned, and then there is the slow turnover of capital peculiar to the steel producer. In last year's group four companies showed a deficit, compared with two in 1926. Also the figures show conclusively that the return in 1926 was not due to the success of one or even of a few large companies. The industry not including the United States Steel Corporation earned a profit of 7.21 per cent. Also the per cent returns of the different companies did not, except in a few cases, fall far below or rise far above the average of the industry as a whole. This does not seem to be true in any of the other groups, where variations were larger.

As in similar previous comparisons in THE IRON AGE, the total stockholders' value is taken as the sum of the common and preferred stock and surplus, and the net profit is the remainder of earnings after providing for all charges, including depletion, depreciation, bond interest and Federal taxes, but not for dividends. Where the company's actual financial statements were not available, the figures were taken from *Poor's* and the *Financial Commercial and Chronicle.*

FORTY PRODUCERS OF IRON AND STEEL

Name of Company	As of December 31, 1925 — Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Earnings for Year	Per Cent Earnings to Stockholders' Value
Acme Steel Co.	$4,332,150	.....	$1,567,774	$5,899,924	$1,179,203	20.00
American Rolling Mill Co.	22,049,644	$11,735,900	12,123,727	45,909,271	4,064,050	8.85
Atlantic Steel Co.	1,000,000	700,000	761,553	2,461,553	198,814	8.08
Bethlehem Steel Corporation	180,151,900	59,891,345	103,100,166	343,143,411	20,246,167	5.90
A. M. Byers Co. (Sept. 30)	750,000	4,500,000	4,490,235	9,740,235	1,465,673	15.04
Central Alloy Steel Corp.	53,542,475	9,489,300	.....	63,031,775	3,331,393	5.29
Colorado Fuel & Iron Co.	34,235,500	2,000,000	2,292,989	38,528,489	2,748,414	7.13
Columbia Steel Corporation	8,041,018	9,485,300	1,043,127	18,569,445	1,090,272	5.87
Crucible Steel Co. of America	55,000,000	25,000,000	22,789,577	102,789,577	6,547,731	6.37
Donner Steel Co., Inc.	4,522,500	9,000,000	1,969,324	15,491,824	736,608	4.75
Eastern Rolling Mill Co.	3,008,772	.....	1,528,216	4,536,988	521,043	11.48
Follansbee Brothers Co.	7,306,500	.....	2,512,789	9,819,289	1,211,759	12.33
Gulf States Steel Co.	12,500,000	2,000,000	3,121,182	17,621,182	799,792	4.54
M. A. Hanna Co.	12,000,000	14,385,400	1,614,052	27,999,452	1,496,389	5.34
Inland Steel Co.	35,000,000	10,000,000	19,830,233	64,830,233	7,147,704	11.03
Interstate Iron & Steel Co.	4,000,000	1,880,200	4,008,422	9,888,622	900,278	9.10
Jones & Laughlin Steel Corp.	57,332,000	56,850,800	40,941,835	155,124,635	14,899,094	9.60
Laclede Steel Co.	2,750,000	.....	2,102,370	4,852,370	753,282	15.52
Ludlum Steel Co.	1,738,165	.....	1,989,313	3,727,478	285,679	7.66
Lukens Steel Co. (Oct. 31)	15,898,800	.....	1,023,744	16,922,544	300,810	1.78
Midvale Co.	14,574,621	.....	921,223	15,495,844	642,462	4.15
National Enameling & Stamping Co., Inc.	15,591,800	10,000,000	2,579,177	28,170,977	614,550	2.18
Otis Steel Co.	3,705,010	8,830,600	9,556,267	22,091,877	1,907,315	8.63
Penn Seaboard Steel Corporation	7,108,723	.....	422,293	7,531,016	24,556	0.33
Pittsburgh Steel Co. (June 30)	17,500,000	10,500,000	8,146,890	36,146,890	2,416,239	6.68
Replogle Steel Co.	16,450,090	.....	1,368,298	17,818,388	718,437	4.03
Republic Iron & Steel Co.	30,000,000	25,000,000	33,562,389	88,562,389	5,065,022	5.72
Rogers-Brown Iron Co.	1,297,843	2,550,000	.....	3,847,843	*483,174	*12.29
Sharon Steel Hoop Co.	14,297,000	999,700	.....	15,296,700	1,295,541	8.47
St. Louis Coke & Iron Corporation	260,000	7,895,300	904,028	9,059,328	434,926	4.77
Sloss-Sheffield Steel & Iron Co.	10,000,000	6,700,000	9,496,176	26,196,176	2,106,759	8.04
Superior Steel Corporation	4,154,223	.....	637,608	4,791,831	271,817	5.67
Taylor-Wharton Iron & Steel Co.	1,600,000	1,875,000	423,686	3,898,686	43,004	1.10
Trumbull Steel Co.	18,177,783	9,998,700	.....	28,176,483	2,263,964	8.03
United States Steel Corp.	508,302,500	360,281,100	761,863,109	1,630,446,709	116,667,405	7.16
Vanadium Corporation of America	14,356,211	.....	2,313,933	16,670,144	1,980,031	11.88
Virginia Iron, Coal & Coke Co.	10,000,000	5,000,000	344,059	15,344,059	84,022	0.55
Wheeling Steel Corporation	39,470,594	27,529,700	7,789,837	74,790,131	5,006,460	6.69
Wickwire-Spencer Steel Co.	8,508,063	.....	.....	8,508,063	*854,357	.....
Youngstown Sheet & Tube Co.	75,000,000	14,241,100	33,382,246	122,623,346	15,148,876	12.35
Total	$1,325,513,885	$708,319,445	$1,102,521,847	$3,136,355,177	$225,278,010	7.18
Total without Steel Corporation	817,211,335	348,038,345	340,658,748	1,505,908,468	108,610,605	7.21

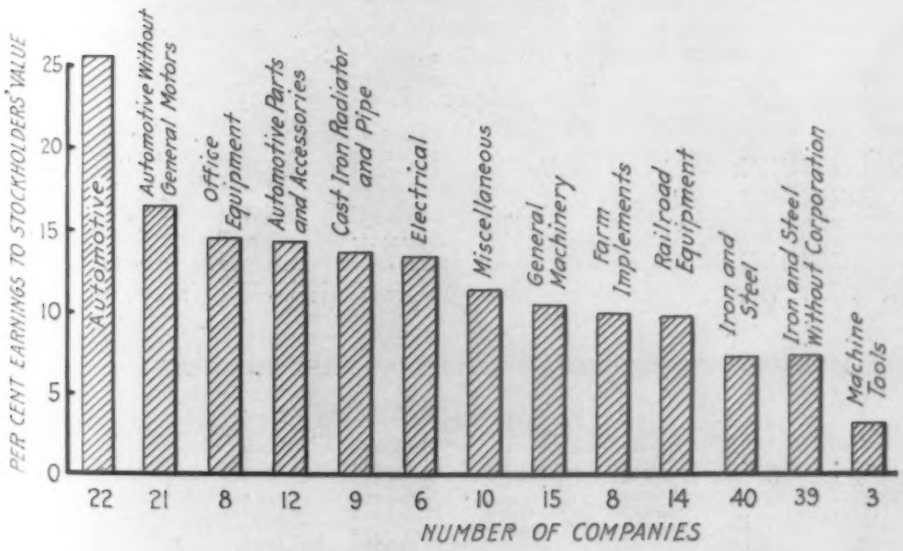
*Deficit.

THREE MACHINE TOOL BUILDERS

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
Greenfield Tap & Die Corporation	$3,248,825	$3,147,000	$309,432	$6,705,257	$544,950	8.13
National Acme Co.	5,000,000	.....	3,234,114	8,234,114	207,722	2.52
Niles-Bement-Pond Co.	8,500,000	3,775,900	3,547,315	15,823,215	192,177	1.21
Total	$16,748,825	$6,922,900	$7,090,961	$30,762,586	$944,849	3.07

TWENTY-TWO MAKERS OF AUTOMOBILES, AIRPLANES AND TRUCKS

	As of December 31, 1925			Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
	Common Stock	Preferred Stock	Surplus			
American-LaFrance Fire Engine Co., Inc.	$3,450,000	$4,000,000	$1,479,547	$8,929,547	$682,102	7.64
Auburn Automobile Co. (Nov. 30)	1,500,000	.....	1,008,391	2,508,391	943,262	37.61
Chandler-Cleveland Motors Corporat'n	15,199,045	1,400,000	.....	16,599,045	401,329	2.42
Chrysler Corporation	56,259,940	.....	13,867,768	70,127,708	15,448,587	22.03
Continental Motors Corporation	17,308,450	.....	10,348,796	25,657,246	2,026,327	7.89
Curtiss Aeroplane & Motor Co., Inc.	938,268	2,523,100	229,164	3,690,532	413,317	11.20
Dodge Brothers, Inc.	243,456	850,000	31,477,234	32,570,690	13,746,657	45.25
Federal Motor Truck Co.	2,000,000	.....	2,868,558	4,868,558	1,222,850	25.11
H. H. Franklin Mfg. Co.	6,675,200	6,216,350	.....	12,891,550	72,381	0.56
Gardner Motor Co., Inc.	1,202,098	.....	.....	1,202,098	126,286	10.50
General Motors Corporation	258,079,950	109,916,000	119,020,473	487,016,423	176,698,743	36.28
Hudson Motor Car Co.	16,626,625	.....	26,375,360	43,001,985	5,372,874	12.49
Hupp Motor Car Corporation	9,138,090	.....	7,947,953	17,086,043	3,507,629	20.53
Jordan Motor Car Co.	2,157,536	943,700	.....	3,101,236	96,794	3.12
Mack Trucks, Inc.	3,366,190	16,253,600	38,015,016	57,364,806	8,852,453	15.43
Nash Motors Co. (Nov. 30)	1,602,000	8,038,400	25,077,872	34,718,272	23,346,306	67.24
Paige-Detroit Motor Car Co.	9,001,202	2,195,800	152,125	11,349,127	500,206	4.40
Pierce-Arrow Motor Co.	5,652,082	10,000,000	2,449,296	18,101,378	1,267,695	7.00
Studebaker Corporation	75,000,000	7,985,000	33,409,038	116,394,038	13,042,119	11.20
White Motor Co.	25,000,000	.....	14,810,403	39,810,403	2,566,291	6.45
Willys-Overland Co.	11,323,305	22,049,500	25,819,582	59,192,387	1,819,690	3.07
Wright Aeronautical Corporation	2,163,168	.....	1,792,057	3,955,225	700,688	17.71
Total all companies	$523,886,605	$192,371,450	$356,148,633	$1,072,406,688	$272,854,586	25.44
Total without General Motors	265,806,655	82,455,450	237,128,160	585,390,265	96,155,843	16.44



SHOWING the Position of the Per Cent Earnings to Stockholders' Value in the Iron and Steel Business in 1926 as Compared With Other Metal Consuming Industries. The influence of the high profits of General Motors on the automotive group is well illustrated

TWELVE MAKERS OF AUTOMOBILE PARTS AND ACCESSORIES

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
American Bosch Magneto Corp.	$10,207,265	.....	.....	$10,207,265	$448,319	4.40
Eaton Axle & Spring Co.	7,453,187	.....	.....	7,453,187	962,054	12.90
Electric Auto-Light Co.	2,618,894	.....	$2,210,081	4,828,975	1,777,694	36.81
Gabriel Snubber Mfg. Co.	1,000,000	.....	872,670	1,872,670	1,033,631	55.13
Hayes Wheel Co.	2,000,000	$1,639,800	4,352,244	7,992,044	308,321	3.86
Kelsey Wheel Co., Inc.	10,000,000	2,210,300	8,915,128	21,125,428	809,334	3.83
Midland Steel Products Co.	5,000	9,554,300	2,982,183	12,541,483	1,748,612	13.94
Moto Meter Co., Inc.	750,000	.....	1,533,829	2,283,829	1,561,974	68.86
Motor Wheel Corporation	5,500,000	1,008,200	5,778,918	12,287,118	1,625,052	13.22
Stewart-Warner Speedometer Corp.	19,155,459	879,800	5,103,339	25,138,598	5,108,885	20.27
Stromberg Carburetor Co., Inc.	600,000	.....	2,205,279	3,805,279	463,146	12.15
Timken-Detroit Axle Co.	8,239,200	4,307,100	1,768,590	14,314,890	1,772,460	12.38
Total	$67,529,005	$19,599,500	$36,722,261	$123,850,766	$17,619,482	14.22

FOURTEEN MAKERS OF RAILROAD EQUIPMENT

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
American Brake Shoe & Foundry Co.	$7,804,650	$9,538,500	$8,119,314	$25,462,464	$3,029,217	11.89
American Car & Fdry. Co. (Apr. 30)	30,000,000	30,000,000	41,245,296	101,245,296	6,102,898	6.02
American Locomotive Co.	25,000,000	25,000,000	16,396,386	66,396,386	8,015,939	12.07
Baldwin Locomotive Works	20,000,000	20,000,000	15,763,833	55,763,833	5,883,907	10.55
J. G. Brill Co.	4,810,200	4,580,000	4,916,668	14,306,868	833,550	5.89
General American Tank Car Corp.	.....	8,319,700	14,266,931	22,586,631	2,265,014	10.03
General Railway Signal Co.	6,500,000	2,575,900	3,542,677	12,618,577	3,927,797	31.12
Gould Coupler Co.	4,687,500	.....	605,962	5,293,462	169,901	3.21
Lima Locomotive Works, Inc.	10,552,850	.....	2,983,072	13,535,922	1,704,828	12.59
New York Air Brakes Co.	16,316,675	.....	.....	16,316,675	1,593,934	9.70
Pressed Steel Car Co.	12,571,250	12,500,000	20,419,480	45,490,730	*620,803	*1.36
Symington Co.	4,591,306	.....	178,465	4,769,771	371,952	7.79
Union Tank Car Co.	24,564,400	12,000,000	8,616,176	45,180,576	3,032,271	6.71
Westinghouse Air Brake Co.	39,642,084	.....	13,085,678	52,727,762	10,535,062	19.98
Total	$207,040,915	$124,514,100	$150,939,938	$481,694,953	$46,845,467	9.72

*Deficit.

SIX MAKERS OF ELECTRICAL MACHINERY AND EQUIPMENT

	As of December 31, 1925			Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
	Common Stock	Preferred Stock	Surplus			
Century Electric Co.	$3,370,100	$250,000	$636,075	$4,256,175	$710,592	16.70
Electric Controller & Mfg. Co.	295,245	361,200	1,555,709	2,212,154	535,865	25.37
Electric Storage Battery Co.	19,947,925	31,400	19,191,244	39,170,569	6,733,782	17.13
General Electric Co.	180,287,046	35,718,825	85,848,171	301,854,042	46,672,499	15.46
Kellogg Switchboard & Supply Co.	6,325,000	.....	1,738,807	8,063,807	693,787	8.60
Westinghouse Electric & Mfg. Co., (March 31)	114,504,450	3,998,700	51,199,385	169,702,535	14,122,000	8.32
Total	$324,729,766	$40,360,125	$160,169,391	$525,259,282	$69,468,525	13.22

EIGHT CAST IRON RADIATOR AND PIPE MAKERS

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
American Radiator Co.	$31,064,025	$3,000,000	$28,879,830	$62,943,855	$12,476,485	19.82
American Steel Foundries	30,000,000	8,881,300	11,641,313	50,522,613	4,675,796	9.25
Centrifugal Pipe Corporation	7,124,795	.....	.....	7,124,795	518,445	7.27
Pittsburgh Steel Foundry Corporation	600,000	740,000	688,162	2,028,162	109,263	5.43
Richmond Radiator Co.	3,279,937	.....	1,079,630	4,359,567	612,962	14.05
U. S. Cast Iron Pipe & Foundry Co.	12,000,000	12,000,000	15,161,678	39,161,678	5,049,367	12.89
U. S. Radiator Corporation (Jan. 31)	.....	4,109,600	3,709,687	7,819,287	1,458,514	18.52
Universal Pipe & Radiator Co.	10,311,577	6,763,914	119,942	17,195,433	1,230,562	7.15
Total	$94,380,334	$35,494,814	$61,280,242	$191,155,390	$26,131,694	13.62

EIGHT MAKERS OF OFFICE EQUIPMENT

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
American Multigraph Co.	$2,340,445	.....	$1,013,550	$3,353,995	$297,707	8.87
Burroughs Adding Machine Co.	15,000,000	$12,702,100	11,788,308	39,490,408	6,065,096	15.36
General Fireproofing Co.	1,636,500	875,600	1,912,299	4,424,399	888,689	20.08
International Business Machines Corp.	24,071,172	.....	.....	24,071,172	3,695,012	15.35
National Cash Register Co.	9,000,000	9,660,950	19,188,935	37,849,885	6,760,639	17.86
Rand Kardex Bureau, Inc. (Sept. 30)	8,798,132	4,445,408	.....	13,243,540	3,082,824	23.27
Remington Typewriter Co.	9,996,000	10,204,400	6,700,553	26,900,953	2,597,345	9.65
Underwood Typewriter Co., Inc.	10,000,000	3,500,000	12,828,899	26,328,899	2,104,878	7.99
Total	$80,842,249	$41,388,458	$53,432,544	$175,663,251	$25,402,190	14.45

EIGHT MANUFACTURERS OF FARM IMPLEMENTS AND TRACTORS

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
Advance-Rumely Co.	$13,750,000	$12,500,000	$1,039,044	$27,289,044	$440,389	1.61
J. I. Case Threshing Machine Co.	13,000,000	13,000,000	2,678,482	28,678,482	3,517,429	12.26
Caterpillar Tractor Co.	6,500,000	.....	8,096,261	14,596,261	4,297,983	28.75
Deere & Co. (Oct. 31)	17,904,400	33,000,000	12,294,022	63,198,422	7,662,850	12.12
Emerson-Brantingham Co. (Oct. 31)	10,132,500	11,084,500	.....	21,217,000	*145,474	*0.68
International Harvester Co.	99,876,772	62,678,400	64,934,939	227,490,111	22,658,892	9.96
Massey-Harris Co., Ltd. (Nov. 30)	12,089,900	12,089,900	2,359,983	26,539,783	1,995,768	7.52
Moline Implement Co.	2,968,741	.....	12,332	2,981,073	383,805	12.80
Total	$176,222,313	$144,352,800	$91,415,063	$411,990,176	$40,811,642	9.90

*Deficit.

FIFTEEN MAKERS OF GENERAL MACHINERY AND EQUIPMENT

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
Allis-Chalmers Mfg. Co.	$26,000,000	$16,500,000	$16,860,355	$59,360,355	$3,596,892	6.02
American Machine & Foundry Co.	6,000,000	.....	7,295,146	13,295,146	754,986	5.67
Babcock & Wilcox Co.	20,000,000	.....	5,805,733	25,805,733	2,036,516	7.88
Bucyrus Co.	3,900,000	4,000,000	5,603,300	13,503,300	1,503,967	11.12
Chicago Pneumatic Tool Co.	10,408,600	.....	4,566,270	14,974,870	1,226,837	8.12
Fairbanks Co.	4,500,000	.....	.....	4,500,000	294,566	6.21
Fairbanks, Morse & Co.	7,565,890	7,529,425	12,678,464	27,773,779	2,854,768	10.28
Independent Pneumatic Tool Co.	3,540,306	.....	.....	3,540,306	993,909	28.02
Ingersoll-Rand Co.	28,000,000	2,525,500	7,426,661	37,952,161	7,878,097	20.75
Otis Elevator Co.	17,012,850	6,500,000	7,682,147	31,194,997	5,062,164	16.22
Sullivan Machinery Co.	1,537,139	3,250,000	6,169,071	10,956,210	951,757	8.69
U. S. Hoffman Machinery Corp.	4,454,682	177,500	2,206,195	6,838,377	1,341,198	19.61
Wellman-Seaver-Morgan Co.	129,353	1,567,200	1,808,087	3,504,640	211,028	6.02
Worthington Pump & M'ch'y Corp.	15,913,504	12,992,147	4,331,100	33,236,751	365,664	1.10
Yale & Towne Mfg. Co.	10,000,000	.....	9,515,112	19,515,112	2,527,754	12.95
Total	$158,962,324	$55,041,772	$91,947,641	$305,951,737	$31,600,103	10.32

TEN MANUFACTURERS OF MISCELLANEOUS METAL PRODUCTS

	Common Stock	Preferred Stock	Surplus	Total Stockholders' Value	Net Profits 1926	Per Cent Earnings to Stockholders' Value
American Can Co.	$41,233,300	$41,233,300	$53,345,092	$135,811,692	$13,736,382	10.11
American Chain Co., Inc.	1,000,000	11,000,000	8,974,466	20,974,466	2,414,891	11.51
Continental Can Co.	24,124,630	5,473,500	5,849,695	35,447,825	3,734,183	10.53
Crane Co.	46,663,000	14,394,100	20,636,253	81,693,353	9,250,957	11.32
Lake Erie Bolt & Nut Co.	500	.....	1,636,993	1,637,493	167,552	10.23
Landers, Frary & Clark	10,500,000	.....	4,418,643	14,918,643	2,474,053	16.51
Remington Arms Co., Inc.	5,348,919	9,901,500	.....	15,250,419	1,414,556	9.27
Savage Arms Corporation	8,664,400	264,000	2,066,641	10,995,041	627,465	5.70
Standard Sanitary Mfg. Co.	25,586,425	4,711,406	14,385,955	44,683,780	7,736,052	17.31
Walworth Co.	15,432,194	1,402,500	.....	16,834,694	561,908	3.33
Total	$178,553,368	$88,380,300	$111,313,738	$378,247,406	$42,117,999	11.13

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Current Statistical Data, Considered Independently of Trade Opinion, Indicate That:

STEEL production continues above normal, March recording the third successive monthly increase.

Finished steel, after a long period of price stability, continues the definite, slow downward movement of the past three months, in conformity with other prices.

Pig iron production, still heavily above normal, moved upward again in March by more than the seasonal percentage.

It seems likely that the firmer pig iron market, developed as forecast a month ago, will be maintained until more is known about how serious the coal strike is to be.

Scrap and billet prices are a little high, compared with other important items.

FOR the first year since 1922 our adjusted steel ingot curve has risen consecutively in the three months of January, February and March. (It will be remembered that by "adjusted" is meant that the usual seasonal changes have been eliminated from the curve and that allowance is made for long-time normal growth. Thus, when the adjusted curve moves up it indicates a gain that is more than usual.)

Ingot production, so adjusted, has not come up to the level reached in February, 1924, when an analogous upturn occurred. It was nearer the 1924 peak last month, however, than we had considered probable. It is impossible at present to say how much of the speeding up of the industry in the early part of 1927 has been due to anticipated difficulties attending a bituminous coal strike. We are inclined to think that this has been a considerable factor and that it affected a wide range of industries which ordered iron or steel a little more freely than they would have done if there had been no strike ahead. It is perhaps not entirely without point that the increase in steel production during the first quarter has been similar to that which occurred in the first quarter of 1922.

Adjusted Index Below Last Year

Be that as it may, our adjusted index of ingot production in March was 113.3, against 107.5 in February and 114.7 a year ago. Thus steel production *was not at such a heavy annual rate as it was last year in March.* Current statements that the month was a record breaker should be discounted. At 13 per cent above estimated normal, however, the volume has been very large.

The magnitude of the volume of production was reflected in lower price levels of finished steel during January and February. March prices, however, remained almost unchanged, THE IRON AGE composite index of finished steel prices averaging 94.7 per cent of the average for the five years 1921-26. This compares with 94.8 per cent in February and 97.3 per cent a year ago.

It will be noted how closely the price curve follows the unfilled orders curve. Unfilled orders, too, declined in January and February and in March remained practically stationary, when allowance is made for the merely seasonal conditions. In fact, the March decline in unfilled orders was slightly less than our estimate of the usual seasonal decrease for the month. A little study of the chart will show that the unfilled orders curve is still significant as an index of the *trend* of demand for steel.

Summing up, it may be said that steel ingot production is much above normal, that unfilled orders are abnormally low, and that efforts to mark up prices appear to have been nearly a complete failure. The statistical position is not one that justifies price ad-

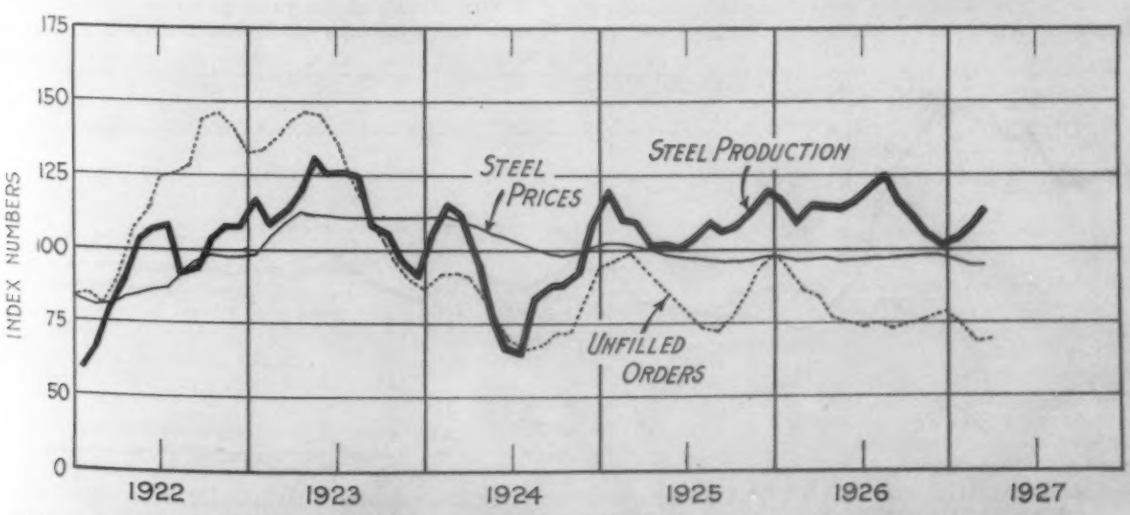


Fig. 1—For the First Time in Five Years, Ingot Production Has Risen in Each of the Three Earliest Months of the Year. Unfilled orders, continuing the general movement of the past 15 months, are still significant of the trend of steel demand. Prices of finished steel have been sagging since December, after a long period of relative stability

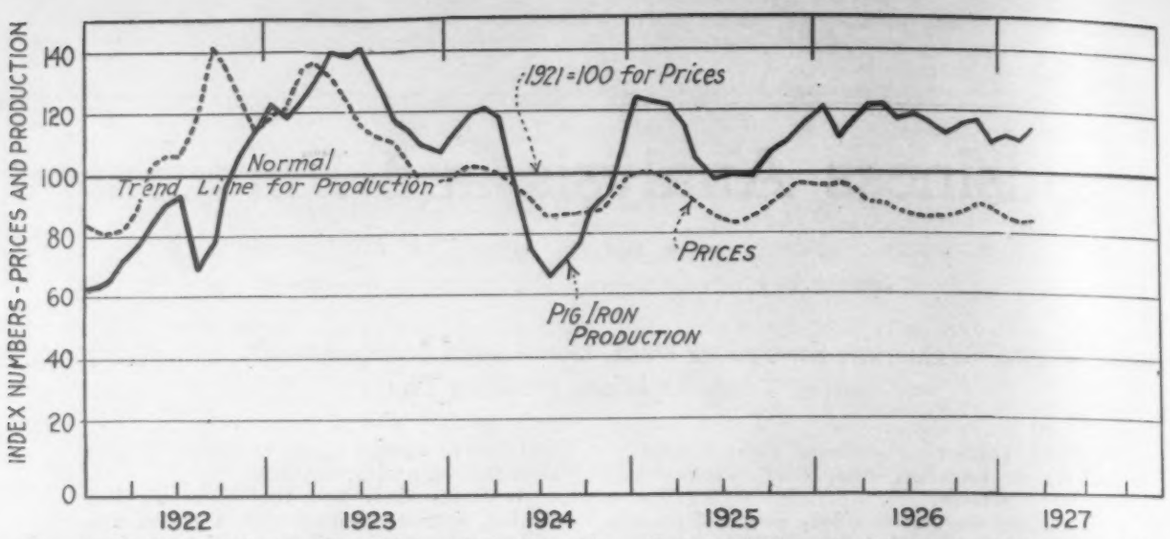


Fig. 2—Pig Iron Production Has Advanced Further Above Estimated Normal. It remains high with relation to steel production. Prices have shown a smaller response to the coal strike than had been anticipated

vances. We think that the undertone of the steel markets will continue weak.

Pig Iron Price Advance Less Than Expected

PERHAPS the most significant fact concerning pig iron is the failure of its price to show any larger advance than has occurred. Prices have risen somewhat during the past month, as forecast, but THE IRON AGE composite at this writing is $19.21, against a low of $18.96 in February—an increase of 25c. The March average was only $19.04, against $19.00 in February and $19.40 in January.

Under some conditions the price of pig iron would have advanced more sharply. The January production showed a decline, both absolutely and in comparison with steel production; and the unsettled outlook for fuel, together with this decline, would ordinarily have run prices up. At present, however, several conditions explain the failure of prices to go through more vigorously: (1) Steel prices are low and none too strong; (2) pig iron production is much above normal and above a normal relation to ingot production; (3) coke prices are weak.

It now looks as though the price of pig iron is likely to hold fairly steady, pending developments in the coal strike.

Our adjusted index of pig iron production registered 117.1 in March, which compares with 110.4 in February and 116.8 a year ago. In other words, pig iron production is 17 per cent above our estimate of normal, against 13 per cent above for steel. Moreover, the trend was upward in March. It does not seem probable, however, that there will be much further increase. Such a movement would be unjustified and is not likely to occur. The pig iron curve may rise further in April, but it clearly is nearing peak levels. Stocks are probably fairly large, though not excessive, and sales appear to be below production.

Price Relationships Holding Uniform

COMMODITY prices in recent months have been quite stable. A slight downward drift appears, but compared with periods of similar length the price curve seems almost level. For one thing, foreign currencies have become more nearly stable, resulting in steadier prices abroad. For another thing, prices have gone down to a point in this country where, on the average, they are sufficiently close to production costs to cause curtailment on further declines.

Finished steel prices, after dipping in January and February, also have held about stable, the average in March being 2.367c. against 2.371c. in February. Judged by the relation between steel prices and the general commodity level that has existed since the war, the average price of finished steel is a little high. This fact doubtless reflects the relatively strong demand for steel that has existed during the past year. The chart suggests fairly stable prices for steel for the next month or two, this conclusion being supported by a fair stability in pig iron and scrap.

Scrap and Billets Possibly Out of Line

Our studies of the price structure this month indicate that scrap and billets are a little high compared

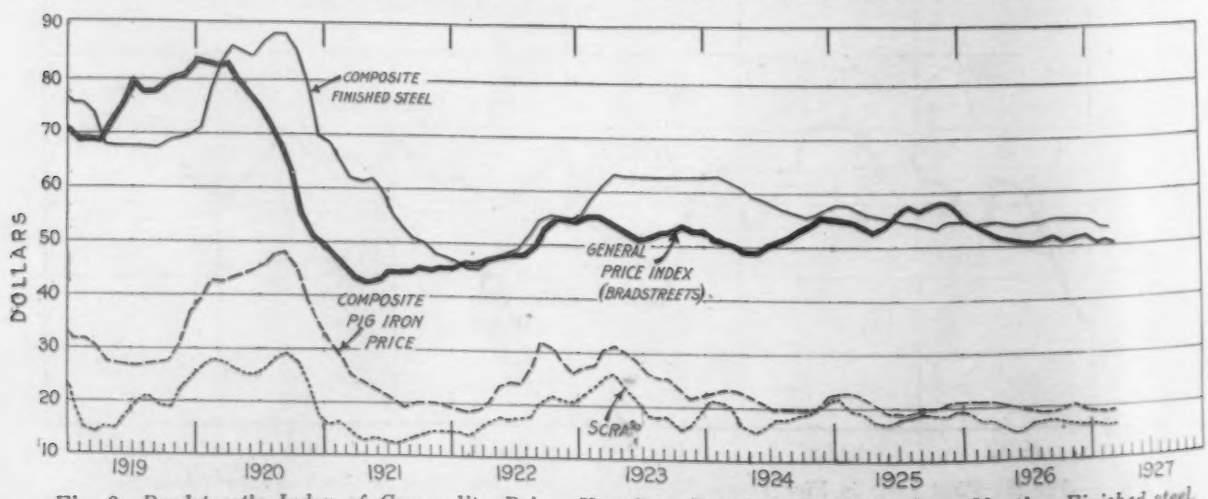


Fig. 3—Bradstreet's Index of Commodity Prices Has Been Relatively Stable for Some Months. Finished steel, pig iron and scrap all have sagged during the past three months, but finished steel maintained its level unusually long, while the three others were falling below it

with most other items of importance. The attempt to advance semi-finished steel appears to have been a mistake and already indications of a return to the lower level have appeared. As to scrap, the prospect is for continued irregularity with a weak undertone predominant. Considering the price of finished steel and the fact that steel production is getting up to a rather high point, and is not gaining on the production of pig iron so rapidly, we are inclined to look for lower scrap prices during the next month or two.

Bookings of Fabricated Structural Steel Fall Off in March

WASHINGTON, April 19.—Bookings of fabricated structural steel in March, as reported to the Department of Commerce, amounted to 178,097 tons, or 65 per cent of the capacity of 275,910 tons of the 189 firms reporting. The computed tonnage was 206,700, a drop of nearly 5 per cent from the February total of 216,240 tons. The March computed total was a slight decrease from that of last year, at 209,880 tons, and from that of 1925, at 209,710 tons. Except for February and December, however, the March total this year is the largest monthly figure since last August.

Shipments are computed, for the 218 identical firms included in the survey, at 200,340 tons in March, a substantial gain over both January and February, but otherwise the smallest total since February, 1926. The reduction from March, 1926, is about 18 per cent, the total for that month being computed at 244,860 tons.

For the first quarter of the year, 1927 shows a heavier tonnage of bookings than in either of the two preceding years, having recorded 594,660 tons, against 579,200 tons in 1926 and 566,530 tons in 1925. Shipments, however, were the lowest of the three years, at 556,500 tons in the quarter. This compares with 642,360 tons a year ago and with 595,700 tons in 1925.

Heavy Production of Steel Barrels in March

WASHINGTON, April 19.—Production of steel barrels in March totaled 575,850, as against 504,134 in February, according to reports received by the Department of Commerce from 28 companies owning or operating 32 plants. The March total was the highest since last July. On the basis of 25 working days, 51.7 per cent of the total monthly productive capacity was used during March, as compared with 46.2 per cent in February. Stocks at the end of March totaled 59,389 barrels, as against 52,360 barrels at the end of February.

Shipments were 568,821 and 503,183 barrels, respectively, while unfilled orders March 31, for delivery within 30 days, totaled 285,702 barrels, as against 252,012 barrels a month earlier. Unfilled orders for delivery beyond 30 days included 1,260,278 barrels March 31, as against 1,411,760 barrels on Feb. 28.

Employment in Ohio

Employment in Ohio foundries and machine shops was 2.3 per cent greater in March than in February, according to the Bureau of Business Research of Ohio State University. The number of workers, however, fell off 5.1 per cent compared with March, 1926. Based upon statistics from 62 companies, employment figures showed that in March, 1927, the number of wage earners stood at 100.5 per cent, with an average month in 1923 taken as 100.

In the steel plants and rolling mills of Ohio the increase in employment during March as compared with February amounted to 4.8 per cent. Compared with March, 1926, there was no substantial change. The wage payments increased 8.6 per cent from February, but declined 2.6 per cent from March, 1926.

Steel Corporation Activities Told at Annual Meeting

The 40 per cent common stock dividend proposed by the board of directors of the United States Steel Corporation was voted at the annual meeting of the corporation held at Hoboken, N. J., April 18. Chairman E. H. Gary, who presided, indicated a probability that the 7 per cent rate will be maintained on the new common stock. The meeting was perhaps the most largely attended in the history of the corporation, and besides a number present representing holdings in person there were proxies in hand for 74.61 per cent of the preferred stock and 81.43 per cent of the common stock.

Judge Gary referred briefly to some of the important plans the corporation has under way, particularly the creation of the research laboratory, which has been mentioned in these columns. He announced as a member of this research staff Prof. R. A. Millikan, a physicist of international renown, the recipient of medals from scientific societies here and abroad and the author of several books on physics and electricity. George Gordon Crawford, president of the corporation's Southern subsidiary, the Tennessee Coal, Iron & Railroad Co., is chairman of the committee planning for this new department.

Among investigations now being pursued by the corporation, Judge Gary enumerated briefly one having to do with cement manufacture, another with recovery of wastes in zinc reduction, another on the production of creosote from by-product coke ovens and the Hornsey-Wills ore smelting process experiments at Lorain, Ohio, looking to a replacement of the blast-furnace by use of electric furnaces.

Suspends Increased Rates on Steel Products in New England

WASHINGTON, April 19.—Acting upon its own motion, the Interstate Commerce Commission today ordered suspended from May 16 to Dec. 16, tariff schedules which, in general terms, proposed to cancel present commodity rates and apply fifth class rates in their place or to increase present commodity rates so as to substantially equal fifth class rates on iron and steel products in New England. The schedules proposed increased rates on iron and steel products in both carload and less-than-carload quantities, but the carload rates only were suspended. Separate consideration will be given the question of suspension of less-than-carload rates, said the commission, "if and when protests are filed in accordance with the rules of practice."

The docket in the case (No. 2890) was made a part of and set for hearing with the general iron and steel rate investigation, but in view of the suspension of the New England rates a further hearing will be scheduled subsequent to the Chicago hearing assigned for May 12. Notice of the time and place of the final hearing will be given.

The Jewell Belting Co., Hartford, Conn., at the annual stockholders meeting last week took no formal action in reference to the ultimate liquidation of the corporation's affairs. The retiring officers and directors were reelected, except Edwin H. Bingham, who was vice-president. No action on his successor was taken.

Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: April 28—General Business Outlook; May 12—Activity in Steel Consuming Industries; May 19—Position of Iron and Steel Producers.

Production of Engines in 1925 Shows Increase Over 1923

WASHINGTON, April 16.—Production of engines and other primary power machines in 1925, according to the Bureau of Census, was as follows:

Reciprocating steam engines, 2338, having a combined rated capacity of 208,311 hp., valued at $4,995,392; steam turbines, 2475, rated hp., 1,111,888, value $9,125,801; steam traction engines (other than locomotives), 101, rated hp., 4127, value $257,623; Diesel engines, 4101, rated hp., 409,390, value $21,979,617; other internal combustion engines, 543,764, rated hp., 8,353,236, value $92,884,161; tractors, 168,299, rated hp., 3,763,023, value $103,900,262; tractor trucks (semi-tractors), 799, value $1,258,808; water turbines and water wheels, 475, value $5,338,066. In addition, engines and turbines to the value of $23,558,168 were reported by manufacturers who failed to supply data as to number and horsepower.

The total, $263,297,898, represents an increase of 18.1 per cent as compared with $222,963,808, the corresponding total for 1923. Of the total value of the 1925 output, $222,390,553 was reported by establishments whose principal products were engines and other primary power machines, and $40,907,345 by establishments which were engaged primarily in other industries but which made engines and other primary power machines as secondary products.

Average horsepowers and reported values per horsepower are shown in the table.

Type of Engine	Number	Horsepower	Value	Average Horsepower	Value per Horsepower
Steam, reciprocating	2,338	208,311	$4,995,392	89.1	$23.98
Steam, turbines	2,475	1,111,888	9,125,801	449.2	8.21
Steam, traction	101	4,127	257,623	40.9	62.42
Total steam	*4,914*	*1,324,326*	*14,378,816*	*269.5*	*10.86*
Diesel	4,101	409,390	21,979,617	99.8	53.69
Other internal combustion	543,764	8,353,236	92,884,161	15.4	11.12
Tractors	168,299	3,763,023	103,900,262	21.2	27.61
Total oil and gas	*716,164*	*12,525,649*	*218,764,040*	*17.5*	*17.46*
Both types of engines	721,078	13,849,975	$233,142,856	19.2	16.84

Methods of Determining Hardness of Metals Compared

The United States Bureau of Standards has just issued a new Technologic Paper, No. 334, in which the relationship is given between the results obtained by two widely used methods of measuring the hardness of metals. In this investigation the Brinell and Rockwell methods were compared, and tests were conducted on a large number of ferrous and non-ferrous metals and alloys. Convenient semi-experimental formulas have been derived, by means of which the Rockwell or the Brinell hardness number can be computed from the other number with an error of less than 10 per cent. Similar formulas were obtained also for tensile strength, which can be computed from the Rockwell number within an error of 15 per cent.

Fortunately, a substitute for the tensile test, which is satisfactory for a great many practical purposes, exists in the so-called indentation hardness test. It is inexpensive, can be made in a few minutes, does not require an expensive preparation of the specimen and can often be made on a finished part without destroying it. This test consists in making an indentation in the part which is tested, by a hard indenting tool loaded with a constant load. It is evident that the harder the material the smaller will be the indentation. Therefore, the size of the indentation is the measure of the indentation hardness. The indentation hardness number which expresses a certain relation between the constant load and the variable size of indentation may be used to calculate with a sufficient degree of accuracy the tensile strength of material.

Two of the most often used indentation tests in this country are the Brinell and the Rockwell tests. In order to be able to compare the hardness or the tensile strengths of two materials for one of which the Brinell and for the other the Rockwell number are known, it is necessary to know the relation between these numbers. This relationship has been worked out in the present investigation.

Copies of this paper may be obtained at 15c. each.

Simonds Economic Essay Contest

Alvan T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., has announced the terms of the sixth of the annual economic contests which he established. The subject of this year's essay is "Who Ultimately Pays the Taxes?" The first prize is $1,000 and the second prize $500. The contest closes Dec. 31. It is stipulated that the essays "be written in a popular style, to interest the 'man on the street,' the average person as well as the technical. They should not be less than 3000 words nor over 5000 words in length." Communications are to be addressed to the Contest Editor, Simonds Saw & Steel Co., 470 Main Street, Fitchburg, Mass.

Arrange Pattern Making and Molding Apprentice Contests

The American Foundrymen's Association, through its apprentice committee, announces that the annual apprentice contest, as developed at the Detroit convention, has been expanded to include both pattern making and molding contests for the 1927 Chicago convention. The plan calls for the holding of district molding and pattern making contests for regularly indentured apprentices under 24 years of age.

The best castings and patterns of these local contests will be sent to the convention of the American Foundrymen's Association to be held the week of June 6 at the Edgewater Beach Hotel, Chicago. From these, the three best in each class will be selected by a committee of judges and will be designated as first, second and third prize winners. In connection with the contest, apprentice training will be discussed at a special session, the leader being H. A. Frommelt, one of the most active men in the apprentice training field.

These district contests are being organized by foundry associations and plants interested in apprentice training with the apprentice committee of the A. F. A. formulating a set of regulations governing these local competitions in order that uniform conditions may prevail. The A. F. A. committee also furnishes sets of blueprints for the patterns to be used in the molding contest and drawings of the casting for which a pattern is to be made in the pattern making contest. Copies of these regulations and blueprints may be obtained by writing to the secretary of the American Foundrymen's Association, 140 South Dearborn Street, Chicago. The molding contests last year were won by apprentices of the General Electric Co. of Erie, Pa., and the Falk and Bucyrus corporations of Milwaukee.

Master Specifications of Commodities

WASHINGTON, April 16.—Containing 446 master specifications of commodities, whose use by Government departments is mandatory, the Bureau of Standards has issued a publication with specifications arranged in alphabetical and numerical order. The specifications are those which had been adopted by the Federal Specifications Board up to Nov. 15, 1926, and represent the work of 74 technical committees, extending over a period of 4½ years. These committees are composed of experts in their respective lines of work in the Government service. In addition to presenting the lists of master specifications, the publication contains instructions for obtaining specifications, many of which are in printed form and may be purchased from the Superintendent of Documents, Government Printing Office, Washington. The price is 10c. each.

Employment in Cleveland gained 2.92 per cent in March over February, according to the monthly survey of the Cleveland Chamber of Commerce based on reports of 100 large employers. The gain in plants engaged in the automotive industry was 9.7 per cent.

Electrochemists to Hold Silver Jubilee

Gaseous Reduction of Ores to Be Fully Discussed—Papers to Review 25 Years of Achievement at Anniversary Session

SEVERAL important sessions have been arranged by the board of directors of the American Electrochemical Society for its twenty-fifth anniversary meeting to be held at the Hotel Benjamin Franklin, Philadelphia, April 28 to 30. There are to be two technical sessions of interest to the steel industry. One on gaseous reduction of ores and other metal compounds, followed by a round table luncheon discussion, and another session, commemorating the twenty-fifth anniversary, at which a large number of brief technical papers are to be delivered. The session on gaseous reduction is scheduled for Thursday morning, April 28, and the so-called "silver jubilee session" for Friday evening, April 29. The technical program for the two sessions is as follows:

Thursday, April 28

9 A. M.: Session on "Gaseous Reduction of Ores and Other Metal Compounds"

"A Resumé of the Factors Influencing the Rate of Gaseous Reduction of Metallic Oxides" (10 min.), by P. H. Emmett.

"Equilibrium for the Reaction 2 CO = CO_2 + C" (5 min.), by Alfred Stansfield.

"Developments in the Low Temperature Reduction of Iron Ores" (10 min.), by Frank Hodson.

"New Method for the Production of Iron Sponge" (5 min.), by Martin Wiberg.

"Gaseous Reduction of Iron Ores" (10 min.), by H. Kamura.

"The Advantages of Smelting Fine-Grained Ores in the Blast Furnace" (10 min.), by Konrad Hofmann.

"The Gaseous Reduction of Zinc" (10 min.), by Charles G. Maier and Oliver C. Ralston.

"The Mechanism of the Metallurgical Production of Zinc" (5 min.), by Max Bodenstein.

"Leaching of Molybdenite Ores" (5 min.), by Carl Svensson.

"Pure Oxides and Salts of Tungsten and Molybdenum" (10 min.), by Edwin K. Jenckes.

"The Gaseous Reduction of Tungsten and Molybdenum Oxides" (15 min.), by E. W. Engle.

"Reduction of Tin Oxide and Cassiterite Concentrates" (5 min.), by Edward F. Kern.

"The Gaseous Nature of Carbon Reduction of Tin Concentrates" (5 min.), by Colin G. Fink and Charles L. Mantell.

"Gaseous Reduction of Tin Concentrates" (5 min.), by Colin G. Fink and Charles L. Mantell.

"The Reduction of Copper Oxide by Gaseous Reducing Agents" (5 min.), by W. G. Palmer.

"Reduction of Metallic Chlorides by Hydrogen" (10 min.), by A. B. Bagdasarian.

"High Speed-High Frequency Inductive Heating" (10 min.), by E. F. Northrup.

"The Minguet Electrode and the Minguet Furnace" (5 min.), by M. A. Arrouet.

"Review of Research Work on the Manufacture of Magnesium" (5 min.), by D. B. Keyes.

Friday, April 29

Technical Papers for Silver Jubilee Session
(10 Min. Each)

"Twenty-five Years of Theoretical Electrochemistry," by Wilder D. Bancroft.

"A Retrospect and a Look Into the Future," by Louis Kahlenberg.

"Development of the Fused Quartz Industry," by R. S. Hutton.

"The Use of Electric Furnaces at Niagara Falls, 1902-1926," by F. A. J. FitzGerald.

"Electrolytic Refining During the Past Twenty-five Years," by Lawrence Addicks.

"Twenty-five Years of Progress in the Cyanamid Industry," W. S. Landis.

"Twenty-five Years of Electrochemistry," by August Elmer.

"The Lead Storage Battery in 1902," by Almon Robinson.

"Twenty-five Years in Retrospect: The Electrolytic Rectifier, Electrolytic Iron, the Dry Cells," by Carl Hambuechen.

(5 Min. Each)

"Twenty-five Years of Electrochemistry," by C. J. Brockman.

"American Electric Steel Expansion in the Last Twenty-five Years," by E. F. Cone.

"Twenty-five Years of Non-Ferrous Electrothermics: Fifteen Years of Electric Brass," by H. W. Gillett.

"The 'Discovery' of Aluminum," by Martin Tosterud and J. D. Edwards.

"Aluminum from Oersted to Arvida," by J. D. Edwards.

"Twenty-five Years' Progress of Electrolytic Zinc," by Oliver C. Ralston.

"Twenty-five Years' Progress in the Electrolytic Refining of Copper," by S. Skowronski.

"Twenty-five Years of Electroplating," by George B. Hogaboom.

"Development and Progress of the Alkali-Chlorine Industry," by D. A. Pritchard.

"Development in the Dry Cell Industry," by C. A. Gillingham.

"The Development of Organic Electrochemistry in the Past Twenty-five Years," by C. J. Thatcher.

"Twenty-five Years of Atmospheric Nitrogen Fixation," by F. A. Ernst.

"Progress in the Art of Electrical Precipitation Since 1900," by P. E. Landolt.

The round table luncheon discussion on gaseous reduction, Thursday noon, April 28 will be in charge of J. Kent Smith, a well-known British metallurgist now located in Detroit. At the technical session on the same subject, Frank Hodson, chairman of the local Philadelphia committee, will preside. The jubilee session will be held at the Old Mohican Club, Morrison-the-Delaware, N. J. Buses will convey members and guests from the hotel to the club, where a dinner will be served previous to the evening exercises. Dr. Edgar F. Smith, president emeritus of the University of Pennsylvania, Philadelphia, will preside and there will also be present charter members of the society, which was organized in Philadelphia in 1902.

Other Sessions and Plant Visitations

On Friday morning, April 29, a symposium is to be held on the electrochemistry of concentrated solutions, at which Prof. Hugh S. Taylor, Princeton University, is to be chairman. On Saturday morning, April 30, a technical session is scheduled on electro-deposition with Dr. William Blum, president of the society, presiding.

Plant visitations have been arranged for Thursday and Friday afternoons to the Westinghouse Electric & Mfg. Co., the Philadelphia Storage Battery Co., the Philadelphia Electric Co., the Conowingo Power Plant (one of the largest in the world) and the E. I. DuPont de Nemours & Co., Deepwater plant, where dies are made.

Special luncheons have been arranged in the grill of the Hotel Benjamin Franklin for each day and all the technical sessions, with the exception of the one on Friday evening, will take place at the hotel.

Bethlehem Steel Co. Wins Awards

Awards for merit have been made by the Sesqui-Centennial Exposition, held last year in Philadelphia, to the Bethlehem Steel Co. A grand prize certificate of award was given for the general excellence of its exhibit displaying the scope of the steel industry, and in addition the company receives grand prizes for steel boiler tubes, charcoal iron boiler tubes, oil engines, centrifugal pumps, etc., and medals of honor were given in 28 specific cases, covering practically its whole range of products from Mayari pig iron to railroad passenger and freight cars.

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Long Range Trends

IT is readily observed that there are differences of opinion as to where we now stand in the business cycle, and even doubts in some quarters whether there is any longer a business cycle like those of the past that have been studied so carefully. Some of the confusion of thought can be reduced if certain allowances are made for long range trends.

One of the difficulties has been that commodity prices have been falling, whereas business experience has associated rising prices with what is roughly called "prosperity." Another confusing point has been that there is much complaint about smallness of profits whereas prices of stocks have risen to relatively high levels. Then there are divergencies between statistics of the physical volume of trade and the amount of labor employment.

In considering the course of commodity prices, allowance should be made for the long range trend, of prices falling after a great war. Both after the War of 1812 and the Civil War prices fell for approximately 30 years. After the first and sharp drop the annual declines averaged nearly 3 per cent. Our recent decline has been substantially continuous for a year and a half. The Bureau of Labor index number stood at 160 for September, 1925, almost the highest in four and a half years, while last month's number, just announced at 145.3, represents a rate of decline of 6 per cent per annum. With the two previous war experiences before us we may assume that about half the decline is reasonably attributable to the long range post-war influence, so that if there is anything to explain it is only one-half as much as would otherwise be required.

Another long range trend is the stability time has been giving to shares of stock. It is common practice to set bonds and stocks as opposed to each other, along the line that when trade is on the wane bonds tend to advance and stocks to decline. Time, however, has been adding to the stability, in the public estimation, of many stocks, including railroad shares, and thus market price movements may to an extent reflect the same phenomenon that used to be expected only in the case of bonds.

There are strong indications of a third long range trend, in the direction of capital being worth less interest charge on account of the increased supply. It is only an inference that given the same minimum of risk and the same trade conditions the use of capital will always be worth the same amount per annum.

Recognition of these three long range trends dispels some of the obscurity, and additional light may be thrown by another line of thought, upon what has not occurred, but which with slightly different mental attitudes might have occurred. After the war we might have rushed into a period of years of extravagances and the putting of much capital into fixed form, unable to yield returns. That occurred in railroading after the Civil War. Our affairs have been kept in more flexible and adjustable form and thus we have escaped a danger that many, in view of past experiences, expected us to be suffering from by the present time.

Thus it would seem, from these longer range views, that the business cycle has been smoothed out to a considerable extent. Though it may be working upon much the same principles as in the past, the effects are much less marked.

Wealth and Saving

A RECENT report by a well known economic body dwelt upon the great increase in saving by the American people as evinced by augmented bank deposits and life insurance. Obviously such a conclusion reveals imperfect economic thinking, and confusion in respect to money, credit and wealth.

As regards an individual, the thrifty man who deposits in a savings bank his surplus of earnings, instead of using it for gasoline, theater-going, and other luxuries, saves; and the more he deposits the more he accumulates. He is not, however, directly accumulating wealth, as he would be doing if he used for the construction of valuable things for himself the part of his time over and above what he had to devote to acquiring his own subsistence.

When he makes a deposit in the savings bank he

participates in a credit transaction. The bank may lend that credit in the form of a mortgage on real estate. The mortgagor may employ his credit in several ways. He may use it for investment in a corporation creating new capital goods, which would be an expression of saving; or he may use it for the acquisition of precious stones, which are a form of wealth but not of capital goods; or he may use it for the purchase of consumption goods, such as a new automobile. If he takes this last course there is consumption, the collective result of which is the same as if the man who made the deposit in the savings bank had used his surplus for his own consumption. The position of one man is improved, that of another is impaired, while that of the national economy is unaltered.

A general increase in deposits in savings banks, in life insurance contracts, etc., does not therefore necessarily imply an increase in national saving. It may rather reflect a transfer of claim upon national wealth from one class of people to another. Of course this is in no wise to deny that accretions in savings bank deposits, life insurance contracts, etc., is generally a good sign, as is likewise increasing acquisition of the stocks and bonds of corporations.

Nevertheless, the only measure of national saving is a physical inventory of national wealth. Unfortunately that is a difficult thing to make. It cannot be said with assurance whether in recent years our national wealth has been increasing at the same rate as formerly or not. Some economists think that the rate has been increasing; others think that it has been diminishing. If there were definite knowledge on this subject it would be easier to forecast what is likely to be our economic position five years hence.

National saving and national wealth must be represented by such things as houses, railroads, factories, mines, etc. It is a difficult thing to estimate the physical property of even a corporation if it be of anything more than moderate size. It is much more difficult to estimate the aggregate of the property in a city, state or nation. When such estimates are made it is customary to carry them forward by the record of annual additions. For example, see estimates of the value of our railroad property. Estimators in this way, however, are apt to overlook that there are subtractions as well as additions. Thus there is litigation at present pending in regard to the Goodyear Tire & Rubber Co., it being charged that many millions of dollars were wasted in cotton plantations in Arizona and a rubber plantation in Sumatra. In those instances, while the physical property still exists it has perhaps ceased to have value.

So it is with factories that have become part of excessive producing capacity and have lost their value by virtue of obsolescence. Plant may lose its value, moreover, by geographical changes, without even becoming physically obsolescent, as witness the transfer of cotton manufacturing from New England to the South.

There is a great field for economists in studying these conditions and trying to make a coordinated survey and to present a true picture of the national position. It may be, however, that this is too great an undertaking for the present state of human knowledge and ability.

Progress in Non-Destructive Testing

FOR many years the disadvantage of using several methods of testing hardness with no means of correlating one with the other has been a handicap to metallurgists. The subject has been frequently discussed at hardness symposiums held by the American Society for Steel Treating, for in many cases one method of testing could be used and another could not. At last, as the result of creditable work by the national Bureau of Standards, reliable equations have been arrived at whereby, on ferrous materials, the Brinell number can be estimated from the Rockwell number within an error of plus or minus 10 per cent.

As a further result of the investigation, which is reviewed on another page, it is now possible, having the Rockwell hardness numbers of a ferrous material, to estimate the tensile strength within an error of plus or minus 15 per cent.

In two respects these results are notable. First, the value of the hardness test per se is greatly increased, because an interchangeability is established of decidedly practical as well as scientific value. Second, the fact that the tensile strength of such a material can be established with reasonable accuracy from hardness values is another step in the advance toward non-destructive testing of materials, in which magnetic methods have thus far played so important a role.

Extending the Uses of Steel

GREAT as the increase has been in the use of steel in displacing wood or other materials, there are some opportunities of which full advantage has not been taken. The steel disk wheel for automobiles is an illustration. When it first came out it was freely predicted that it would soon replace wood. The fact remains, however, that after some years it has not made the strides that were expected. This may be due largely to its higher cost, a factor not lost sight of in these days of keen competition among the various types of automobiles. A paradoxical situation is that although higher in cost the steel wheel is being used more extensively on low-priced than on high-priced cars. The General Motors Corporation employs it on only two of its models, the Chevrolet and Oldsmobile, as standard equipment. Most of the corporation's other cars have wood wheels as standard equipment, with disk or wire wheels optional with the buyer. It is stated in the automobile trade that fewer disk wheels were sold as original equipment in 1926 than in 1925. Here, it would appear, is a chance for commercial research and promotion on the part of steel producers.

HOW fully the British steel industry has recovered from the disastrous coal strike of 1926 was indicated in our London cable of last week. The March steel output was at a rate of nearly 11,400,000 tons per year. It brought the monthly average for the first quarter to 833,100 tons, a rate not equaled since the war. Pig iron production last month, at 558,100 tons, was similarly heavy, with the quarter's monthly rate also higher than at

any time since the war. Exports alone failed to break records, being about 10 per cent below the 1925 high average monthly performance.

For Supervised Correspondence Schools

AN organized effort is under way to curb fraudulent or indifferent correspondence schools by laws placing them under the jurisdiction of the educational authorities of the states. The well-established schools for instruction by mail serve a good end, but their success has attracted unscrupulous persons into the field. In some cases, it would appear, little capital is used beyond that required for the preliminary advertising. Credulous persons are induced by promises and testimonials to send money for tuition. Usually so-called "lessons" are sent in return, meeting the letter of the law, perhaps, but the material is often useless. Various trades are picked up as likely to be easily worked. Cases of this character have come to the attention of employers in industrial plants.

The movement on foot bids fair to put a check on such schemes, and a bill has been drawn for presentation to state legislatures with a view to establishing a practice which in time may become general. Severe penalties are directed against doing business as a correspondence school without a permit from a regularly constituted examining board, whose duty would be to study carefully the prospectus and details of lessons, in fact the whole curriculum which the proposed school offers. Established schools and legitimate new enterprises would not suffer from such regulation, and an effectual safeguard would be provided in a field in which exaggerated promises have brought loss and disappointment.

CORRESPONDENCE

How Business Has Gained by Getting Away from the Cycle

To the Editor: The course of business activity during the past few years has run contrary to the predictions of many forecasters who placed too much dependence upon the graphs and charts of the business cycle. In fact, the deviation has been so marked that some now contend that in years gone by we labored under an illusion and that there really is no such thing as a business cycle.

However, the peaks and valleys of the trade barometer of the past are a matter of record and cannot now be lightly explained away. In fact, they occurred with such regularity that the temptation to apply some suitable mathematical equation to plot their course could only be overcome with difficulty. The state of business activity at any particular time is the final resultant of so many conditions on the one hand and so many individual acts on the other, that an exact analysis is impossible.

The reasons why the trend in recent years has been contrary to previous expectations are, of course, many and varied. They have been set forth and discussed by able economists in the public press. However, the writer feels that one of the major influences has not been given sufficient prominence. This is the education of the average business man in practical economics. Through a combination of bitter experience and careful study he has learned two facts of fundamental importance: first, that the capacity of our country to produce usually exceeds our capacity to consume; second, that the greatest profits are made by those who anticipate rather than those who follow the course of business activity. The knowledge and application of these facts have exerted a powerful influence to alter the form of the business cycle.

A slight stiffening of prices in a given commodity no longer causes a stampede of buyers ready to make distant future commitments for fear that the supply will be insufficient to meet the demand. Purchasing for future as well as current needs was an important factor in the rising phase of the cycle. Inasmuch as our resources and plant capacity are so ample, it is no longer necessary to pyramid distant requirements on top of immediate necessities.

Furthermore, it was common practice to construct plant extensions in the prosperous period. The demand for producers' goods for this purpose in an already active market for consumers' goods raised prices still higher and enhanced the state of business activity still further. In many cases, however, the new facilities built at high cost came into production when conditions were no longer favorable and demand had slackened. The abrupt halt of construction and the effort to reduce accumulated stocks sent the business barometer upon a precipitous downward course.

The executive who made his plant extensions in a period of depression not only reduced the necessary capital outlay by taking advantage of the lower prices prevailing at those times, but the increased facilities were then available to take care of the demand when activities began to expand. Such foresight naturally reflected itself in greater profits.

With the growing interest in the study of economics more and more business men attempted to take advantage of these conditions. The natural result was to remove buyers from the rising phase and transpose them to the declining phase of the cycle. This could have only one effect—diminished demand in the one period would lower the peak and increased support in the other would raise the valley of the chart. In other words, the tendency would be toward leveling the cycle.

This process coupled with the influence previously mentioned, namely, confining purchases to current needs, has been important among the causes which straightened out or altered the old business cycle beyond recognition.

ALWIN SCHALLER.

Wellsville, N. Y., March 31.

Transportation Key to Coal Strike Situation

To the Editor: We desire to congratulate you on editorial, "The Coal Strike." Whoever wrote that editorial has a clear and practical view of the situation as we see it.

It is our opinion that this coal strike will not develop to its full strength until September. There is also a possibility of a complication of anthracite developments.

It is our opinion that the United Mine Workers cannot win a decisive victory without the assistance of some branch of the railroad employees.

The financial pressure on some operators in Illinois and Indiana is enormous at this time and although they know it would be a bad deal to sign with the union, they might do it feeling it is better to sacrifice something in the future for present financial relief.

Your advice in the last paragraph is certainly good. For some years we have been giving more attention to transportation as a factor in the coal situation than anything the United Mine Workers might do.

W. L. BYERS,
Vice-president, Producers Coke Co.

Uniontown, Pa., April 15.

Technical Program for British Steel Men

Variety of Subjects for May Meeting of Iron and Steel Institute—New American Members—Leading Metallurgist for New President

THE annual meeting of the Iron and Steel Institute is to be held May 5 to 7 at the Institution of Civil Engineers, Great George Street, London, England. The following technical program has been arranged:

"The Ac_1 Range in Special Steels," by J. H. Andrew and H. A. Dickie.

"The Properties of Some Nickel-Chromium-Molybdenum Steels," by J. H. Andrew, M. S. Fisher and J. M. Robertson.

"The Drawing of Steel Wire and Its Relation to Qualities of Steel," by E. A. Atkins.

"Theory of the Growth of Cast Iron Repeatedly Heated," by C. Benedicks and H. Löfquist.

"An Experimental Inquiry into the Interactions of Gases and Ore in the Blast Furnace," by W. A. Bone, L. Reeve and H. E. Saunders.

"The Influence of Annealing Temperature on the Properties of Mild Steel Sheets," by C. A. Edwards and J. C. Jones.

"The Metal Manganese and Its Properties; also the Production of Ferromanganese and Its History," by Sir Robert Hadfield.

"Low-Carbon Alloys of Iron and Manganese," by Sir Robert Hadfield.

"Heat-Resisting Steels," by W. H. Hatfield.

"Alloys of Iron Research, Part VIII.—The Constitution of Alloys of Iron and Phosphorus," by J. L. Haughton.

"A Further Investigation of the Indentation Hardness of Metals," by K. Honda and K. Takahasi.

"The Phenomenon of Temper-Hardening in Steels," by T. Matsushita and K. Nagasawa.

"Some Aspects of the Technical and Economic Conditions of the Heavy Metallurgical Industry of the East of France, with Particular Reference to the Utilization of Gases and Motive Power," by J. Seigle.

"Some Notes on Cold-Rolled Strip Steel," by T. Swinden and G. R. Bolsover.

"Notes on Pseudo-Twinning in Ferrite, and on the Solubility of Carbon in Alpha Iron at the A_1 Point," by S. Tamura.

"The Manufacture of Steel in India by the Duplex Process," by B. Yaneske.

"Alloys of Iron Research": Introductory, by W. Rosenhain. Part V.—Preparation of Pure Chromium, by F. Adcock; Part VI.—Preparation of Pure Manganese, by Marie L. V. Gayler; Part VII.—Preparation of High Purity Silicon, by N. P. Tucker.

Bessemer gold medals will be presented to Axel Wahlberg and Prof. C. Benedicks. F. W. Harbord, the newly elected president, will be inducted and the annual dinner will be held on Thursday evening, May 5.

By invitation of the council of the West of Scotland Iron and Steel Institute, the autumn meeting will be held at Glasgow, Scotland, Sept. 20 to 23, at the Royal Technical College, George Street.

American Candidates for Membership

Among candidates for membership whose names appear on the voting list for the annual meeting, are the following: Robert Hollenbeck Aborn, Massachusetts Institute of Technology, Cambridge, Mass.; Clyde E. Bayer, open-hearth department and George J. Bayer, superintendent steel finishing department, Standard Steel Car Co., Butler, Pa.; Walter Crafts, metallurgist, South works Illinois Steel Co., South Chicago Ill.; Frank W. Davis, International Combustion Engineering Corporation, New York; Charles Feledy, Standard Steel Car Co., Butler, Pa.; J. Birchard Green, president Chicago Steel & Wire Co., Chicago; Macon E. Greenhow, metallurgist, National Brake & Electric Co., Milwaukee; Kent Harrison, open-hearth superintendent, Coatesville, Pa.; Dr. F. C. Langenberg, Watertown Arsenal, Watertown, Mass.; Raymond L. Rolf Lakeside Steel Improvement Co. and Columbia Axle Co. Cleveland; Charles Harry Shapiro, Reed Roller Bit Co., Houston, Tex.; Robert E. Sherlock, Donner Steel Co., Buffalo.

The New President

F. W. Harbord, the incoming president of the institute, is a past president of the Institution of Mining and Metallurgy, associate of the Royal School of Mines, fellow of the Institute of Chemistry and fellow of the Chemical Society. He received his scientific education at the Royal School of Mines, and was awarded the Bessemer medal at the final examination for the associateship.

F. W. HARBORD

After he left the School of Mines, in 1882, Mr. Harbord was for a short time with Dr. J. E. Stead, of Middlesborough, and was then appointed as metallurgical chemist at the works of Sir Alfred Hickman and the Staffordshire Steel & Ingot Iron Co., Ltd., where for seven years he was identified with the development of the basic Bessemer, and basic open hearth processes.

In 1892 he was appointed metallurgical chemist to the Government of India at the Royal Indian Engineering College, Coopers' Hill, where he was responsible for the greater part of the analytical work connected with the Indian Government Railways.

In 1904 he was appointed metallurgist to a commission sent over to Europe by the Canadian government to investigate and report on the position of electric smelting in Europe. In 1909 he was appointed by the Transvaal Government to visit that country and report on the commercial possibilities of iron and steel manufacture in the colony.

For eight years previous to the war, Mr. Harbord was a civil member of the old ordnance board, and is at present a civil member of the new ordnance committee at Woolwich Arsenal. He has made various visits to America and Canada to report on various iron and steel projects, especially in connection with the Dominion Iron & Steel Co., for whom he acted as consulting metallurgist for some years.

In 1916 he was awarded the Bessemer medal by the council of the Iron and Steel Institute. During the war he acted as consulting metallurgist to the Ministry of Munitions.

He is the author of the standard book: "The Metallurgy of Steel," now in its seventh edition, and has revised and enlarged the sixth edition of Roberts-Austen's "Introduction to the Study of Metallurgy."

After the closing of the Royal Indian Engineering College in 1905, Mr. Harbord started in private practice as a consulting metallurgist at 16 Victoria Street, Westminster, London, and in 1908 went into partnership with the late Edward Riley, and is now the senior partner in the firm of Riley, Harbord & Law at the Victoria Street address. Apart from the metallurgy of iron and steel, Mr. Harbord has had a large experience in general metallurgy, especially in the electric smelting of zinc.

For his war services, in 1917 he was made a Companion of the British Empire, and the French Government also conferred upon him the honor of Chevalier of the Legion of Honor.

Iron and Steel Markets

New Business in Steel Falls Off

Mill Operations Still Show Influence of March Bookings and Strike Precautions—Shrinkage in Automobile Demand—Coke Further Reduced

NEW business in steel, with the possible exception of structural shapes, is running 5 to 25 per cent under the sales of the same period of March. Mill operations have not slackened to the same degree. Due to orders accumulated last month and a less complacent attitude toward the coal strike than taken by consumers, producers have curtailed output less than 5 per cent. And a 6 per cent cut in ingot production would still make the current month the highest April on record.

Steel prices show no noteworthy changes. The surprising fact is that they are still irregular in the face of the heavy, diversified consumption. The lifting of prices proves difficult under a condition of starting each week with little indication of the source of added business and yet ending it with a sizable total of bookings.

A pronounced falling off in automobile steel demand gives point to claims that this has reached the year's peak. Some motor car companies are operating full, some fairly well, but others are at a low rate. Buying by two large builders for their new models is expected soon, but generally the industry is ordering even closer than it did a month ago.

Shrinkage in demand for oil country pipe is progressive, with no signs of a change for some weeks. Shipments of rails and tin plate are also at the expense of order books. Rail mill activity has been extended in cases by using pressure to draw out specifications. The curtailment in tin plate followed the stocking of finished product and can material by can makers.

Steel bar mills are in the strongest position among producers as regards rather full second quarter orders, particularly in the Chicago district.

Sheet stability, following one of the most active months in the history of the trade, is weakened by the diminished promise of automobile needs. Most finishes are quotably $1 a ton lower than a week ago.

Oil tank orders feature the plate market, one oil company closing for 8960 tons of tank construction. A Pittsburgh coal company bought 6000 tons for barges.

The total of structural steel awards for the week was close to 48,000 tons, but fresh inquiries called for only 12,000 tons. Bookings included a 6000-ton bridge over the Monongahela River at Clairton, Pa.

A new factor in structural shapes is the putting into operation by the Bethlehem Steel Co. at its Buffalo plant of a Grey, or wide flange beam, mill which can ship to the Middle West and the East by water.

In the railroad equipment field are reported the purchases by the Union Tank Car Co. of 500 tank cars and by the Western Maryland of fabricated car parts for 1000 hopper cars.

Curtailment of foundry operations is reported, notably at Cincinnati, Pittsburgh and along the Eastern seaboard, and is restraining further purchases of pig iron. Two eastern Pennsylvania plate mills have bought 15,000 and 20,000 tons of basic pig iron, respectively, at prices that have ruled for several weeks.

Another week of the coal strike has brought further weakness in fuel prices, and furnace coke has declined 10c. a ton to $3.15, Connellsville.

Pittsburgh scrap dealers, who counted on the coal strike to cause the use of more scrap in blast furnaces in order to conserve supplies of coke, find that they miscalculated. Heavy melting steel has declined 25c. a ton at Pittsburgh and Chicago, and in virtually all centers, except Buffalo, the scrap market has a weaker tone.

Most hot rolled strip consumers are well covered for second quarter needs and current quotations are not tested. The plan of establishing a price range of 3c. to 3.25c. for the cold rolled product, depending on the size of the order, has not stood up under competition, and the round lot price, 3c. Pittsburgh or Cleveland, rules for small lots.

Consumption of wire products is seasonally high, but the practice of jobbers and consumers of letting mills carry stocks has not required an expansion of mill activity beyond an average of 60 per cent.

Several open market buyers of iron ore have purchased approximately 80 per cent of their expected requirements for 1927. Those having long term contracts have closed on nearly the maximum amount for the year. The Ford Motor Co. bought 365,000 tons against its inquiry of 385,000 tons. The first cargo of the season left Escanaba April 17.

Chinese buying of steel is almost normal, according to a cable despatch from Shanghai. Stocks of silver in that city aid buyers, but shipments into the interior are subject to war delays.

Both of THE IRON AGE composite prices remain unchanged, that for pig iron at $19.21 a ton for the third week and that for finished steel at 2.367c. a lb. for the ninth week. Finished steel is 3 per cent lower than a year ago; pig iron is 9 per cent lower.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Apr.19, 1927	Apr.12, 1927	Mar.22, 1927	Apr.20, 1926
No. 2 fdy., Philadelphia	$21.76	$21.76	$21.76	$22.76
No. 2, Valley furnace	18.50	18.50	18.50	19.00
No. 2, Southern' Cin'ti	21.69	21.69	21.69	25.69
No. 2, Birmingham	18.00	18.00	18.00	22.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	22.00
Basic, del'd eastern Pa.	20.75	20.75	20.75	21.75
Basic, Valley furnace	19.00	19.00	18.50	18.50
Valley Bessemer, del'd P'gh	21.26	21.26	21.26	21.26
Malleable, Chicago*	20.00	20.00	20.00	22.00
Malleable, Valley	18.50	18.50	18.50	19.00
Gray forge, Pittsburgh	19.76	19.76	19.76	20.26
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04
Ferromanganese, furnace	100.00	100.00	100.00	88.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh	33.00	33.00	34.00	35.00
O.-h. billets, Pittsburgh	33.00	33.00	34.00	35.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	40.00	40.00	40.00	40.00
O.-h. billets, Phila	39.30	39.30	39.30	40.30
Wire rods, Pittsburgh	42.00	42.00	43.00	45.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.90	1.90	1.90	2.00
Steel bars, Chicago	2.00	2.00	2.00	2.10
Steel bars, New York	2.24	2.24	2.24	2.34
Tank plates, Pittsburgh	1.85	1.85	1.85	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.10
Tank plates, New York	2.19	2.19	2.19	2.24
Beams, Pittsburgh	1.90	1.90	1.90	1.90
Beams, Chicago	2.00	2.00	2.00	2.10
Beams, New York	*2.14*	2.19	2.19	2.24
Steel hoops, Pittsburgh	2.30	2.30	2.30	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Apr.19, 1927	Apr.12, 1927	Mar.22, 1927	Apr.20, 1926
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.75	2.75	2.75	3.10
Sheets, black, No. 24, Chicago dist. mill	2.95	2.95	2.95	3.25
Sheets, galv., No. 24, P'gh	*3.60*	3.65	3.65	4.05
Sheets, galv., No. 24, Chicago dist. mill	3.85	3.85	3.85	4.25
Sheets, blue, 9 & 10, P'gh	*2.15*	2.20	2.20	2.40
Sheets, blue, 9 & 10, Chicago dist. mill	2.35	2.35	2.35	2.60
Wire nails, Pittsburgh	2.55	2.55	2.55	2.65
Wire nails, Chicago dist. mill	2.60	2.60	2.60	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., P'gh	3.25	3.25	3.25	3.35
Barbed wire, galv., Chicago dist. mill	3.30	3.30	3.30	3.40
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$14.75*	$15.25	$15.00	$16.50
Carwheels, Philadelphia	16.00	16.00	16.00	17.50
Heavy melting steel, P'gh	*16.50*	16.75	16.75	16.50
Heavy melting steel, Phila.	14.50	14.50	14.50	16.00
Heavy melting steel, Ch'go	*13.00*	13.25	13.00	13.00
No. 1 cast, Pittsburgh	16.00	16.00	16.00	16.50
No. 1 cast, Philadelphia	17.00	17.00	17.00	17.50
No. 1 cast, Ch'go (net ton)	16.50	16.50	16.50	16.25
No. 1 RR. wrot., Phila.	16.50	16.50	17.00	17.50
No. 1 RR. wrot., Ch'go (net)	*12.25*	12.50	12.00	12.25
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.15*	$3.25	$3.25	$3.00
Foundry coke, prompt	4.00	4.00	4.25	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.12½	13.12½	13.50	14.12½
Electrolytic copper, refinery	12.87½	12.75	13.12½	13.75
Zinc, St. Louis	6.37½	6.40	6.65	6.95
Zinc, New York	6.72½	6.75	7.00	7.30
Lead, St. Louis	*6.90*	7.00	7.30	7.50
Lead, New York	*7.15*	7.25	7.65	7.85
Tin (Straits), New York	68.62½	67.75	69.25	62.50
Antimony (Asiatic), N. Y.	15.50	15.00	13.00	17.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Demand for Most Finished Steel Products Shows Further Decline—Bookings of Structural Steel Improve

PITTSBURGH, April 19.—The steel market in general is quieter than it has been, but the rate of reaction from the activity of last month is much slower in plant engagement than in orders and specifications. Ingot production in this and nearby districts is still close to 85 per cent of capacity, compared with the recent peak of 90 per cent, but contrasted with that performance is the fact that new business in all finished products, with the possible exception of structural steel, is running from 5 to 25 per cent smaller than in the same period of last month.

The shrinkage in demand for oil country pipe is progressive, and the full force of the loss of business due to the heavy overproduction of oil and the cutting down of well drilling is now being felt. Moreover, hopes are not so strong as they were recently that corrective measures would be applied and bring about a sufficient advance in oil prices to encourage drilling activities at least by mid-summer. The feeling now is that a real demand for casing and drill and drive pipe is lost for this year.

Rail and tin plate shipments continue at the expense of order books, and lately there has been a definite drop in tin plate specifications, since the container manufacturers are heavily stocked with tin plate or the cans. New business in the automobile steels is running materially smaller than in March, and sheets also have failed to maintain the March rate of sales activity. There has been definite improvement in the bookings of structural steel, notably on business of local origin, which calls for approximately 20,000 tons, chiefly in bridges and barges.

Maintenance of ingot production in the face of these conditions in finished steel can be ascribed chiefly to the fact that in almost all products there was a good carry-over of orders from March into April. It might also be observed that the steel industry does not take quite so complacent a view of the possible effects of the coal strike as do a good many steel consumers. Even in pipe, which is making a showing that is as poor as it ordinarily is good, there is building of stocks, and in other products that can be stocked output is large in relation to current requirements. The coal strike itself remains negative so far as the supply of coal is concerned, and the market actually is weaker instead of stronger in face of the fact that weekly production has dropped to approximately 8,000,000 tons, as compared with 13,000,000 tons in the last full week preceding the suspension of union mines. Even non-union production does not seem to be fully wanted at present, but later will come the demand from the Northwest for winter supplies and a different story then is likely.

Steel prices show no noteworthy changes. In a general way, they remain favorable to buyers, but producers are impressed by the fact that cost economies have been effected to about the maximum extent possible. It is also apparent that price alone is not a strong inducement to buyers if they do not have the requirements.

Business in pig iron is so light that it is a question whether there is a market for that commodity, and the coal strike to date has not stimulated the scrap market, as many dealers had expected. Coke is extremely hard to sell.

Pig Iron.—The market is extremely dull, and such purchases as are being made are for the purpose of maintaining stocks and not with any idea of increasing them. Melters see nothing in the coal strike to be disturbed about, and since the melt is not so heavy as it has been, they view the matter of supplies complacently. Prices are holding, not because there is a lack of supplies, but because producers are indifferent about selling in view of the possibility that if the coal strike takes an unfavorable turn it will catch many unawares and cause a scramble for supplies, such as usually brings a rapid advance in prices. Sales of about 500 tons of Bessemer iron are noted, but one Pittsburgh district melter recently asked prices on 1000 tons and then withdrew the inquiry. No sizable sales of basic iron are noted, and in foundry and malleable grades business is entirely in carload lots.

Prices per gross ton f.o.b. Valley furnace:

Basic	$19.00
Bessemer	19.50
Gray forge	$18.00 to 18.50
No. 2 foundry	18.50 to 19.00
No. 3 foundry	18.00 to 18.50
Malleable	18.50 to 19.00
Low phosphorus, copper free	28.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Makers of ferromanganese are beginning to canvass for last half business and are naming the present price of $100, Atlantic seaboard. No business worth noting has yet been closed for that period and current purchases do not amount to much, but consumers who are covered by contracts for the first half of the year are reported to be specifying well. Business in spiegeleisen and high grade ferrosilicon also is largely in specifications against contracts. The spot situation in spiegeleisen is slightly easier than it has been, as there are some instances of contract buyers not ordering out full quotas.

Semi-Finished Steel.—New business is slow, and specifications are not so large this month as they were in March. The explanation is found in the fact there was a little extra buying of billets, slabs and sheet bars to build up stocks as a coal strike precaution, as well as in the fact that sheet, tin and strip mill operations are lower this month than last. No considerable tonnage of billets or slabs is moving at more than $33, Pittsburgh or Youngstown, and on sheet bars $34 is the ruling quotation. Makers of wire rods holding to $43, base Pittsburgh or Cleveland, are losing business to others who will take it at $1 to $3 a ton less. The pipe market is giving such a poor account of itself, except on line pipe, that the market for skelp is extremely dull. There seem to be no deviations from $40, base, on forging quality billets and blooms.

Wire Products.—Consumption is high, as is usual at this time of the year, and is aided by the fact that the spring is fairly early this year. As there has been a tendency on the part of jobbers and consumers to let the mills carry the stocks, the activity in consumption is reflected in the demands upon the mills. Mill operations vary considerably, ranging from as low as 45 per cent to as high as 75 per cent, with the average between 55 and 60 per cent. Prices are steady here and in most Northern centers of distribution.

Rails and Track Supplies.—Not much activity is noted in either light or standard-section rails. Most of the latter for spring and early summer laying have been shipped, while the coal strike is a factor in limiting sales of light-section rails. A continued good movement of the accessories is noted. Prices show no change.

Tubular Goods.—No improvement is observed in the demand for oil country pipe, and while there is a rather constant call for standard-weight pipe, it lacks the volume common to this time of year and also reflects a disposition on the part of the jobbers to let the mills carry the stocks. Mill stocks are large, and there are few sizes on which early delivery cannot be made. Line pipe business is still the backbone of the market. No award yet is noted of the 400 miles of 22-in. pipe for the gas line to run from Amarillo, Tex., to Denver. Competition for this line is likely to be fairly sharp, as besides the National Tube Co., the Youngstown Sheet & Tube Co. and Spang, Chalfant & Co., a Milwaukee company which electrically welds is reported to be able to make pipe of that diameter. Some pick-up in the demand for boiler tubes is reported, and mechanical tubing is moving steadily.

Sheets.—Business continues to recede from the pace it attained in March, which was one of the most active months in the history of the trade, and in the effort of makers to maintain reasonably economical mill schedules, prices are no more than steady. Sales of black sheets at more than 2.85c., base Pittsburgh, are few and small, while 2.20c., base, seems to be all that can be easily obtained on blue annealed sheets, although there is a better order book in that grade than in the other common finishes. On galvanized sheets 3.75c., base, is more of an asking than a sales price. There is a very fair movement of automobile body sheets, but lack of the usual amount of Ford and Dodge business is felt. Other motor car builders are doing well but are not offsetting the light operations of those companies.

Tin Plate.—New business is light, even counting in the export sales, and with specifications against contracts tapering off, the slant of mill operations is down. Container manufacturers usually reach the peak of spring inventories about this time of the year, and ordinarily there is a pause in demand until the packing prospects are appraised. Some effort has been made this year to curtail pea and green corn planting to permit a reduction in the surplus of canned goods from last year.

Cold-Finished Steel Bars and Shafting.—New business is still falling, but the heavy ordering of last month continues to be reflected in well sustained mill operations and shipments. Prices are not over strong, and 2.40c., base Pittsburgh, is subject to shading even on moderate-sized lots.

Hot-Rolled Flats.—Users of strips appear to have accumulated a little stock as a result of last month's heavy shipments, and the specifications and deliveries so far this month have been about 10 per cent smaller than in the same period in March. On such new business as has come into the market, there have been no important deviations from prices announced around the

The Iron Age Composite Prices

Finished Steel

April 19, 1927, 2.367c. a Lb.

One week ago	2.367c.
One month ago	2.367c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High		Low	
1927	2.453c.,	Jan. 4;	2.367c.,	Feb. 21
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	April 24;	2.446c.,	Jan. 2

Pig Iron

April 19, 1927, $19.21 a Gross Ton

One week ago	$19.21
One month ago	19.04
One year ago	20.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1927	$19.71,	Jan. 4;	$18.96,	Feb. 15
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	March 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	2.09c.
F.o.b. Cleveland	1.90c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c.

Rail Steel

F.o.b. mill	1.75c. to 1.80c.
F.o.b. Chicago	1.90c. to 2.00c.

Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c. to 2.22c.
Common iron, del'd New York	2.14c. to 2.24c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	1.95c. to 2.05c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.12c. to 2.22c.
Del'd New York	2.14c. to 2.24c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.07c. to 2.22c.
Del'd New York	2.09c. to 2.24c.
C.i.f. Pacific ports	2.25c. to 2.30c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.30c.
All gages, 6 in. to 12 in., P'gh	*2.10c.
All gages, narrower than 6 in., Chicago,	2.40c. to 2.60c.
All gages, 6 in. and wider, Chicago,	2.30c. to 2.50c.

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.40c.
Bars, f.o.b. Chicago	2.40c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.00c.
Strips, f.o.b. Cleveland mills	3.00c.
Strips, delivered Chicago	3.30c. to 3.55c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.55
Galv'd nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.25
Barbed wire, painted	3.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

	Base to Retailers Per Net Ton
F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.15c. to 2.25c.
Nos. 9 and 10, f.o.b. Ohio mill	2.15c. to 2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.35c. to 2.45c.
Nos. 9 and 10, del'd Philadelphia	2.47c. to 2.57c.
Nos. 9 and 10, f.o.b. Birmingham	2.35c. to 2.45c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.85c.
No. 24, f.o.b. Ohio mill	2.80c. to 2.90c.
No. 24, f.o.b. Ch'go dist. mill	2.95c. to 3.05c.
No. 24, del'd Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	3.10c. to 3.20c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	3.90c. to 4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.75c. to 3.95c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.75c.
No. 24, f.o.b. Ohio mill	3.60c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c. to 3.95c.
No. 24, del'd Philadelphia	3.92c. to 4.07c.
No. 24, f.o.b. Birmingham	3.90c. to 4.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill	3.10c. to 3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.10c. to 4.30c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.50
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.60

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.40
8-lb. coating I.C.	11.70
15-lb. coating I.C.	14.85
20-lb. coating I.C.	$16.20
25-lb. coating I.C.	17.90
30-lb. coating I.C.	19.45
40-lb. coating I.C.	21.65

Alloy Steel Bars

(F.o.b. Pittsburgh or Chicago)

S. A. E. Series Numbers	Base Per 100 Lb.
2100*	(1½% Nickel, 0.10% to 0.20% Carbon) $3.00 to $3.15
2300	(3½% Nickel) 4.30 to 4.40
2500	(5% Nickel) 5.50
3100	(Nickel Chromium) 3.30 to 3.40
3200	(Nickel Chromium) 4.75 to 5.00
3300	(Nickel Chromium) 7.00 to 7.25
3400	(Nickel Chromium) 6.25 to 6.50
5100	(Chromium Steel) 3.30 to 3.40
5200*	(Chromium Steel) 7.00 to 7.50
6100	(Chrom. Vanadium bars) 4.20 to 4.30
6100	(Chrom. Vanad. spring steel) 3.80
9250	(Silicon Manganese spring steel) 3.20 to 3.25
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.) 4.10 to 4.20
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.) 4.20 to 4.30
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.) 4.25 to 4.35
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.) 3.40 to 3.50
	Chromium Molybdenum spring steel (1—1.25 Chrom., 0.30—0.50 Molybdenum) 4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	$36.00 to 38.00

Track Equipment

(F.o.b. Mill)

	Base Per 100 Lb.
Spikes, ⅜ in. and larger	$2.80 to $3.00
Spikes, ½ in. and smaller	2.90 to 3.25
Spikes, boat and barge	3.25
Tie plates, steel	2.35
Angle bars	2.75
Track bolts, 1¼ in. and ⅞ in.	3.90 to 4.00
Track bolts, ¾ in. and smaller, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	18
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	18
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	⅛ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1⅝ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3½ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3½ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	53
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

end of February, but with 90 per cent or more of the consumers covered for the second quarter prior to the advance then made, it is obvious that no real test has yet been made of current quotations. To a considerable degree also this is the situation in the hoop and band sizes.

Cold-Rolled Strips.—April to date has fallen well under the same period in March in both specifications and shipments. The automobile builders are taking less tonnage, pending the receipt of more detailed information regarding retail sales and the spring and summer business prospects. On new business all makers in this territory are quoting 3c., base, for carloads or more, but a real test of that price is deferred by the fact that consumers generally were covered against second quarter requirements at lower figures.

Steel and Iron Bars.—Makers filled up rather well with second quarter business in the last half of March, and so far as order books are concerned they are rather well off. Specifications, however, are lighter, and there is not quite so good a demand for spot tonnages as was true a few weeks ago. The quotable market is still 1.90c., base Pittsburgh, but that price is being named even on less-than-carload lots, and is not obtainable very far beyond the Pittsburgh district proper. Eastern mills are reported to be taking moderate-sized lots at 1.85c., Pittsburgh. Iron bars are slow, and even 2.75c., base, would not hold on a sizable tonnage.

Structural Steel.—Two bridges and 40 barges account for more than 15,000 tons of steel, which will be fabricated in local shops, and with obstacles in the path of the extension to the William Penn Hotel removed, the prospect of local fabricators is further brightened. There is a good operation of structural mills and a good flow of orders, but no material strengthening in prices. The market is still 1.90c., base Pittsburgh, but that price does not seem to be "good" much beyond the Pittsburgh district.

Plates.—Between barges, railroad car repair work and large-diameter pipe orders, plate makers are getting a good volume of business. But it is not sufficient to give the market much strength. Ordinary tonnages are still bringing 1.90c., base Pittsburgh, within the area controlled by Pittsburgh mills through freight rates, but beyond this area they would have to go to 1.85c., base, to meet competition.

Bolts, Nuts and Rivets.—There still is evidence of opposition by jobbers to the new prices, but manufacturers are standing pat, feeling that the new schedules have not yet had sufficient trial to warrant any revision. Jobbers say that on bolts it will be necessary for them to stock and carry for long periods certain sizes if they want to escape an extra charge of 10 per cent for broken cases or kegs.

Coke and Coal.—Spot furnace coke of standard grade has been selling lately at as low as $3.15 per net ton at ovens, and $3.25 is now more of an asking than a sales price. Standard foundry coke for spot shipment is in such limited demand that some producers find sales difficult even at $4, and it is probable that a firm bid of less might interest some producers who have loaded cars and no orders. The market is weak because even what ordinarily would be considered a small supply is more than ample. The Connellsville production could be reduced without causing a shortage, but there evidently is some desire to avoid unemployment in the district just now in the fear that it might lead to unrest that would be helpful to union activities. A Buffalo iron maker that covered for April on the coke for two furnaces appears to have made arrangements for May and June supplies with a Buffalo by-product coke producer at a price equivalent to less than $3.50, Connellsville, the basis of most of the second quarter contracts for Connellsville furnace coke. There is too much coal for current requirements, and an easy price situation.

Old Material.—Price changes in the past week have been downward. Not many grades have changed because there has been little consumer interest in the market, and the common attitude of dealers is that it is dangerous to sell much scrap at today's prices since it is not easy to buy it and make a profit. Compressed and bundled sheets cannot be sold at the prices of a week ago, and dealers who bought blast furnace grades on the theory that the coal strike would mean an early shortage of coke and a demand for scrap to make coke supplies last longer, miscalculated and are anxious to be rid of their purchases at cost or less. The coal strike has not affected the supply of coke, and the use of scrap in pig iron has not increased. On compressed sheets, $16 is now the maximum going price, and on blast furnace grades $12.50 is all that can be easily done, although more is wanted by most dealers. The pinch in the supply of machine shop turnings seems to be over.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$16.50 to $17.00
Scrap rails	16.00 to 16.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	15.50 to 16.00
No. 2 railroad wrought	16.50 to 17.00
Heavy steel axle turnings	14.50 to 15.50
Machine shop turnings	12.50 to 13.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phosphorus billet and bloom ends	21.00 to 21.50
Low phosphorus mill plate	20.50 to 21.00
Low phosphorus, light grade	18.00 to 18.50
Low phosphorus sheet bar crops	20.00 to 20.50
Heavy steel axle turnings	15.00 to 16.00
Electric Furnace Grades:	
Low phosphorus punchings	19.00 to 19.50
Heavy steel axle turnings	15.00 to 16.00
Blast Furnace Grades:	
Short shoveling steel turnings	12.50
Short mixed borings and turnings	12.50
Cast iron borings	12.50
No. 2 busheling	12.50
Rolling Mill Grades:	
Steel car axles	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades:	
No. 1 cast	16.00 to 16.50
Rails, 3 ft. and under	18.50 to 19.00
Malleable Grades:	
Railroad	16.50 to 17.00
Industrial	16.00 to 16.50
Agricultural	15.50 to 16.00

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, ¾ in. and smaller, per 100 count.	62½ per cent off list
Machine bolts, per 100 count.	62½ per cent off list
Carriage bolts, per 100 count.	62½ per cent off list
Nuts, all styles, per 100 count	62½ per cent off list
Large rivets, base per 100 lb	$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	2.90
Cement coated nails, per keg	2.95

Total apparent consumption of Babbitt metal in February, based on reports received by the Department of Commerce from 27 firms, was 4,574,931 lb., as compared with 4,975,552 lb. in the previous month, and with 5,139,952 lb. in February, 1926. Except for last November and December, the February total was lower than for any month in more than two years.

Chrome vanadium steel socket wrenches, 7/16 to ⅞ in. inclusive in size, together with various types of handles and including extension pieces and universal joint, are now available from the Bonney Forge & Tool Works, Allentown, Pa., in an enameled metal carrying case with leather handle suitable for shop mechanics.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00 to $34.00
Rerolling, under 4-in. to and including 1¾-in.	34.00 to 35.00
Forging, ordinary	40.00
Forging, guaranteed	45.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00 to $34.00
Smaller than 8 in. x 2 in.	34.00 to 35.00

Skelp

	Per Lb.
Grooved	1.90c.
Sheared	1.90c.
Universal	1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$40.00 to $43.00
Screw stock	$5.00 per ton over base
Carbon 0.20% to 0.40%	3.00 per ton over base
Carbon 0.41% to 0.55%	5.00 per ton over base
Carbon 0.56% to 0.75%	7.50 per ton over base
Carbon over 0.75%	10.00 per ton over base
Acid	15.00 per ton over base

*Chicago mill base is $43 to $44. Cleveland mill base, $43.

Prices of Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.50c. to 11.00c.
Iron ore, Swedish, average 66% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	40c. to 41c.
Manganese ore, Brazilian, African or Indian, basis 50%	40c. to 42c.
Tungsten ore, high grade, per unit, in 60% concentrates	$11.00 to $12.00
	Per Ton
Chrome ore, Indian basic, 48% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.50
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$3.15 to $3.25
Foundry, f.o.b. Connellsville prompt	4.00 to 4.50
Foundry, by-product, Ch'go ovens	9.75
Foundry, by-product, New England, del'd	12.50
Foundry, by-product, Newark or Jersey City, delivered	9.59 to 10.77
Foundry, Birmingham	5.50 to 6.00
Foundry, by-product, St. Louis	10.25

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $2.00
Mine run coking coal, f.o.b. W. Pa. mines	1.80 to 2.00
Mine run gas coal, f.o.b. Pa. mines	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines	1.35 to 1.45
Gas slack, f.o.b. W. Pa. mines	1.50 to 1.60

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$37.00
Domestic, 16 to 19%	36.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$85.00 to $87.50
75%	145.00

	Per Gross Ton Furnace		*Per Gross Ton Furnace*
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	$45 to 46.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
10%	$34.00	12%	$38.00
11%	36.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		*Per Gross Ton*
6%	$26.50	10%	$32.00
7%	27.50	11%	34.00
8%	28.50	12%	36.00
9%	30.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd ..... $1.05 to $1.10
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads ..... 11.50c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace ..... $3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads $200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton $91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per net ton $122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.50 to $17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	——
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagon	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago and Pittsburgh. †Bolts with rolled threads up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60 and 5

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5 to 70 and 10
F.o.b. Chicago	70, 10 and 5 to 70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Sharp Gain in Steel Sales—Building Permits Set Record—Scrap Declines

CHICAGO, April 19.—The past week has been active in sales of finished steel products, the total being fully 50 per cent larger than the average so far this year. The situation in the automotive industry remains spotty, and a slowing down by one builder is counterbalanced by larger specifications from another maker, with the net result that total releases from the automotive trade have not varied widely in the past month. Building permits in Chicago, as well as in Illinois, have established a new record for the first half of April. This is reflected in a more active demand for shapes, fresh inquiry this week calling for 5000 tons. Awards, including 1700 tons for a public utility building in Oklahoma, total more than 6000 tons. Orders for oil storage tanks are a feature of the market, and there are fresh indications that a round tonnage of tankage is still to be placed.

The demand for steel bars is steady, and prices are showing greater strength. Shipments of this commodity up to the middle of April have been heavier than last year, and mills now have backlogs covering five to six weeks of production.

Pig Iron.—The market has settled down to a consistent rate of buying for current needs. For the most part, users are well covered for the second quarter, and while some iron has been sold for delivery in July and August, there are no indications of greater activity in that direction at this time. A Chicago user is asking for 1000 tons of malleable iron. An inquiry is before the trade for 500 tons of Bessemer iron, and a Milwaukee buyer wants 500 tons of foundry iron. Users in general are accepting shipments against past obligations; in fact, hold-up orders are giving little or no trouble to sellers. The silvery market is dull, sales being few in number and of carlot proportions. Charcoal iron is steady at $27.04, delivered. Repairs to an Iroquois furnace are rapidly nearing completion.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sil. 1 to 2 per cent, copper free	$31.50 to 32.00
Silvery, sil. 8 per cent	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered at consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is quiet and without feature. Specifications for ferromanganese and ferrosilicon are in good tonnage, and prices of these commodities are unchanged. Spiegeleisen is being quoted at $37, Hazard, Pa., in small lots and for reasonably prompt delivery.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $85 to $87.50; spiegeleisen, 18 to 22 per cent, $44.76.

Structural Material.—The demand for plain material is growing slowly, but steadily, as numerous small-tonnage contracts are placed with fabricating shops. Building permits in Chicago during the first half of April have established a record. Plans for some of the larger projects, such as the *Daily News* building and the warehouse for Marshall Field & Co., are being pushed by architects and engineers. Contracts calling for from 5 tons to 50 tons are affording a substantial increase in the activity of small shops. Recent awards include 1000 tons for an office building at Omaha, 800 tons for a memorial building at Ames, Iowa, and 650 tons for a railroad viaduct in Chicago. Fresh inquiry calls for 4500 tons, including 1700 tons for a bank building at Gary, Ind.

Mill prices on plain material per lb.: 2c. to 2.10c., Chicago.

Bolts, Nuts and Rivets.—Second quarter contracting at the new schedule is practically completed. Specifications are steady, with some improvement noted from the manufacturers of farm implements. The volume of orders for small rivets is well sustained, and prices on all sizes of rivets are holding.

Cast Iron Pipe.—The market is active, and sellers expect five or six large contracts to be closed this week. Prices are growing firmer, and considerable small tonnage is going at, or near, $38, base Birmingham, for 6-in. and larger diameters. On the more attractive tonnages prices range from $36 to $37. A Western maker bid $36.25, base Birmingham, or $44.75, delivered, on a sizable tonnage of 20-in. pipe for Milwaukee. Gas companies are in the market with three large inquiries. Small orders are numerous, and there are now fully 20 fresh inquiries, averaging 75 tons each, before the trade. Deliveries are obtainable in 30 to 60 days, depending upon sizes wanted. Shipments are moving forward steadily, and stocks in the hands of producers are practically negligible. Elkhart, Ind., divided 1400 tons of 6 to 20-in. pipe between the United States Cast Iron Pipe & Foundry Co. and the Lynchburg Foundry Co. Five hundred tons of 12 and 14-in. pipe for Rochester, Mich., has been awarded to a contractor. Fresh inquiry includes 300 tons of 6 to 12-in. Class B pipe for Holland, Mich.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $44.20 to $46.20; 4-in., $48.20 to $50.20; Class A and gas pipe, $4 extra.

Sheets.—Sheet production in this district is a trifle lighter. Order books are small, and mills are operating on a hand-to-mouth basis. The manufacturing trade, particularly makers of light tanks, is taking a good tonnage of heavy-gage blue annealed sheets, and the galvanized roofing trade is enjoying a fairly active spring demand. Purchases are small, and buyers are demanding prompt shipment. Current quotations in and close to Chicago are holding, but in outlying territory prices are weak, the location and competitive conditions setting the price.

Prices per lb., delivered from mill in Chicago: No. 24 black, 3c. to 3.10c.; No. 24 galvanized, 3.90c. to 4c.; No. 10 blue annealed, 2.40c. to 2.50c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Reinforcing Bars.—This market shows a decided improvement in volume of sales. Several heavy tonnage contracts have been signed for large apartment buildings, and new projects keep the pending list heavy. An uncommonly large number of small jobs, requiring 10 to 25 tons each, are being placed from day to day. For the first time in four or five months bending shops have been speeded up, and shipments are on the upturn. A school building program for the Chicago Board of Education is rapidly taking shape. Though prices are not changed, they lack strength. Billet steel bars are being quoted at 2.30c. to 2.75c. warehouse. Rail steel reinforcing bars are quoted at 2.10c. to 2.55c., Chicago, but competition from outside mills is tending to unsettle the price situation. Recent awards and new inquiries are shown on page 1187.

Bars.—Shipments of soft steel bars in the first half of April were heavier than in the corresponding period of last year. Sales for the week exceeded by a fair margin the average for the past month, and the flow of specifications continues at the rate of the past 14 days. By far the largest demand is coming from the automotive industry, which at the moment shows a tendency toward lighter production. At the same time reports indicate that two of the largest makers of motor cars are about to enter the market for material required for new models that are about to be placed on the market. Orders from warehouses are a trifle heavier, and there is a better feeling throughout the agricultural implement trade as shown by an increase in current steel requirements. Of all finished steel products, bars are in the strongest position both as to price and order books. Backlogs cover not far from five weeks of production, but it is occasionally possible to offer better deliveries on small tonnages when they fit into current rollings. The iron bar market is quiet from the standpoint of new business. Specifications from the car builders are of moderate size. The demand for alloy steel bars has shown a slight recession as a result

of less active demand from the automobile trade. Deliveries are on the whole satisfactory, and prices are steady. New business in rail steel bars is well maintained. Specifications are in excess of production, and both producers continue to operate on a double turn basis. The manufacture of barn equipment has passed its seasonal peak and is slowing down, but on the other hand, there is more active inquiry from implement builders. Prices of rail steel bars, at 1.90c. to 2c., Chicago, lack strength as a result of competition from mills in the St. Louis district.

Mill prices per lb.: Soft steel bars, 2c. to 2.10c., Chicago; common bar iron, 2c., Chicago; rail steel bars, 1.90c. to 2c., Chicago.

Plates.—Demand is steady, and prices are unchanged at 2c., Chicago, for the bulk of going tonnage and at 2.10c. for small and miscellaneous orders. Structural shops are taking more plates, but specifications from the car builders are lighter. Probably not more than 15 per cent of the tonnage on recent contracts for cars is still to be ordered from the mills. In railroad equipment the week has been unusually quiet. The expected inquiry from the Illinois Central has not materialized, and there has been a delay in the placing of 1500 cars by the Pere Marquette. Fresh inquiry calls for about 400 tons for 100 underframes that are to be placed under wooden-body ice cars. A public utility with holdings in California has ordered a gas holder that will take 750 tons. The low prices of petroleum products are still forcing an expansion in storage facilities, and two oil refiners in the Southwest have closed for 11,000 tons of tankage, of which one-half will be fabricated in the Chicago district. No new storage tank business has come into the market, and outstanding inquiry now totals between 8000 and 10,000 tons. Deliveries on plates are easier and, depending on the specifications and the rolling schedules, range from prompt to shipment in 30 days.

Mill prices on plates per lb.: 2c. to 2.10c., Chicago.

Rails and Track Supplies.—Small orders for standard-section rails continue to be placed, the total this week from five railroads being 5000 tons. Mill schedules have not yet been reduced, but in some cases producers have had to bring pressure to bear in order to draw in specifications so that rolling schedules could be kept at 80 to 85 per cent of capacity. A Western mill has booked 7000 kegs of spikes, 1000 tons of tie plates, 1600 kegs of bolts and 600 tons of angle bars for the Pennsylvania Railroad. The Chesapeake & Ohio is reported to have awarded 2000 kegs of spikes to an Eastern mill. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36 to $38. *Per Lb.:* Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.

Hot-Rolled Strip.—Specifications are liberal, and productive capacity in this district is fully 90 per cent engaged. Competition for going tonnage is keen, and prices are weak.

Billets.—Rerolling billets, 4-in. and larger, are steady at $34 per gross ton, Chicago. Sales, however, are light, and there has been no real test of the market.

Warehouse Business.—The demand from warehouses is steady and at the rate of a year ago. The price situation on common wire nails is easier, $2.85 being quoted on lots of 25 to 50 kegs and $2.95 for orders of 5 to 10 kegs.

Wire Products.—Orders from the jobbing trade are in good volume in the East and in the upper Mississippi River Valley. The spring demand in the extreme South has passed, and floods in the lower Mississippi River basin have seriously interfered with distribution. The demand in the Mountain States is fair, and the Northwest is showing greater activity. Specifications from the manufacturing trade are a trifle heavier. Mill operations are being held at 60 to 65 per cent of capacity. Recent sales of wire rods disclose a range of $43 to $44, base Chicago mill, the lower price being quoted on attractive business.

Coke.—This market is steady, and prices are firm for the by-product foundry grade at $9.75, local ovens, and $10.25, delivered in the Chicago switching district, with an advance of 50c. a ton on spot sales.

Old Material.—Prices are in the main weaker. Users have small stocks, but they will not buy in excess of actual requirements. Incoming shipments, particularly from the country, have become heavier as spring has advanced. Deliveries by the railroads are prompter and heavier, following the release of cars that were pressed into coal delivery service prior to the strike called on April 1. Users in Wisconsin are holding down inventories in order to avoid paying a tax on surplus stocks. Production of cast iron borings is larger, and dealers are having less difficulty in filling past obligations. The threat of higher delivered prices on scrap as a result of an increase, May 1, in Chicago district switching rates, has prompted only a few buyers to take additional tonnage and then only in relatively small lots. The Chicago, Milwaukee & St. Paul is advertising 1500 tons.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades	
Heavy melting steel	$13.00 to $13.50
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	14.50 to 15.00
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.50 to 10.00
Acid Open-Hearth Grades	
Forged, cast and rolled steel car-wheels	15.75 to 16.25
Railroad tires, charging box size	16.00 to 16.50
Railroad leaf springs, cut apart	16.00 to 16.50
Steel couplers and knuckles	15.50 to 16.00
Coil springs	16.00 to 16.50
Low phosphorus punchings	15.50 to 16.00
Electric Furnace Grade	
Axle turnings	12.50 to 13.00
Blast Furnace Grades	
Axle turnings	11.00 to 11.50
Cast iron borings	10.25 to 10.75
Short shoveling turnings	10.25 to 10.75
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades	
Iron rails	13.50 to 14.00
Rerolling rails	16.00 to 16.50
Cupola Grades	
Steel rails, less than 3 ft	16.50 to 17.00
Angle bars, steel	14.50 to 15.00
Cast iron carwheels	14.75 to 15.25
Malleable Grades	
Railroad	15.75 to 16.25
Agricultural	14.75 to 15.25
Miscellaneous	
*Relaying rails, 56 to 60 lb	25.50 to 26.50
*Relaying rails, 65 lb. and heavier	26.00 to 31.00

Per Net Ton

Rolling Mill Grades	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	21.00 to 21.50
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	11.50 to 12.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.75 to 7.25
Locomotive tires, smooth	15.50 to 16.00
Pipes and flues	7.50 to 8.00
Cupola Grades	
No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	15.50 to 16.00
No. 1 agricultural cast	14.75 to 15.25
Stove plate	13.50 to 14.00
Grate bars	13.00 to 13.50
Brake shoes	12.00 to 12.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.85c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	2.85c. to 2.95c.
Cement coated nails, base per keg	2.95

New York

Foundry Melt of Pig Iron Tapers—Weakness More Evident in Sheets

NEW YORK, April 19.—The melt of pig iron in this territory is gradually tapering. This is particularly true among jobbing foundries, although some manufacturing plants, notably radiator manufacturers, have also curtailed operations. There is nothing to indicate, however, that the castings business is entering a protracted dull period, and thus far few deliveries against pig iron contracts have been held up. The chief effect to date has been increased caution regarding future requirements. On the other hand, a few of the larger melters are quietly sounding out the market for round tonnages. One of them has issued a formal inquiry for 3000 tons of foundry iron, and another is tentatively in the market for 1200 tons. Sales by local brokers in the past week, made up mainly of small lots, totaled only 7500 tons. The price situation shows little change. The opening of navigation in the New York State barge canal has resulted in more active solicitation of orders for barge delivery. While the barge rate from Buffalo to points in the lighterage limits of New York harbor is still $2.75 per ton, it is possible that this figure may be revised downward. At $2.75, delivered quotations on Buffalo foundry iron range from $20.25 to $20.75 for No. 2 plain.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)	$22.41
No. 2 plain fdy. (by barge, del'd alongside in lighterage limits, N. Y. and Brooklyn)	$20.25 to 20.75
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.89 to 23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.39 to 23.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.89 to 24.02
No. 2 Virginia fdy., sil. 1.75 to 2.25	27.04

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania, $5.54 from Virginia.

Ferroalloys.—Specifications on contract for ferroalloys continue heavy, but new business is very light and made up entirely of carload and small lots. It is understood that the Ford Motor Co. has purchased at least part of the ferromanganese which it was inquiring for recently. Prices continue firm. In Spiegeleisen there are occasionally a few orders for carload and small lots, but no large inquiries are noted. Sales of the British and German product are being made frequently and it is stated that the Marietta furnace in Pennsylvania of E. J. Lavino & Co. has lately been turned from ferromanganese to spiegeleisen, in addition to the Virginia furnace of the same company which has been producing spiegeleisen since the first of the month. Sales of this product are being made on the basis of $37, Hazzard, Pa. Specifications on contract are heavy.

Finished Steel.—Prices of sheets have weakened. Blue annealed sheets are being sold at 2.15c. to 2.20c., Pittsburgh, while black sheets are now 2.75c. to 2.80c. and galvanized sheets 3.60c. to 3.65c. The lower figures are $1 a ton below the prices which have prevailed for a month or more. On the heavier hot-rolled products—plates, shapes and bars—the tendency to consider large tonnage on a special basis appears to be gaining ground among the mills. In structural shapes there is a variety of prices, each project being given separate consideration. On ordinary lots of shapes quotations range from 1.75c. to 1.90c., Pittsburgh, but the lower figure is occasionally shaded on the more attractive jobs. Prices of fabricated structural steel also continue weak, notwithstanding the fairly large tonnages that recently have been placed. An outstanding event in the Eastern structural steel market is the starting up of the new grey structural mills of the Bethlehem Steel Co. at Lackawanna, N. Y., making it possible for shipments of shapes to go by water to Detroit, Chicago and other westward points at prices which probably will be competitive with rail shipments from other mills more closely located to these consuming centers. Water shipments will probably also be made to Boston and other cities on the Atlantic seaboard. Distribution of pipe from warehouses in Brooklyn and New Jersey cities has been adversely affected by a strike of plumbers in the Brooklyn borough and by a strike of common laborers in New Jersey. These strikes have been in effect since April 1, but their influence on the pipe trade is just now being felt. The April volume of steel orders is holding up fairly well on some products, but is declining somewhat on other products, so that the general average in this district appears to be slightly downward from the March rate.

Mill prices per lb. delivered New York: Soft steel bars, 2.24c.; plates, 2.14c. to 2.24c.; structural shapes, 2.09c. to 2.24c.; bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Prices continue fairly firm, with Southern makers endeavoring to adhere to about $37 per ton, Birmingham. Current purchasing is small and mostly by private consumers. One of the large pending inquiries, which is expected to close this week,

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	
Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	5.75c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	50 to 50 and 10
1 x 30 in. and smaller	45 to 50
Carriage bolts, cut thread:	
½ x 6 in. and smaller	50 and 10
¾ x 20 in. and smaller	50
Coach screws:	
½ x 6 in. and smaller	50 and 10
1 x 16 in. and smaller	50
Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¼-in. butt	51	37
⅜-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	4	+19
¼-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	8	+16

Tin Plate (14 *x* 20 *in.*)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 *x* 20 *in.*)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

calls for 6000 tons of 20-in. and 12-in. water pipe for Rochester, N. Y., for which figures were asked by the J. G. White Engineering Co., New York. Among small municipal inquiries is a prospective contract at Hillside, a suburb of Elizabeth, N. J., involving about 400 tons of water pipe, and another at Hamburg, N. J., calling for about 500 tons of water pipe.

Prices per net ton, delivered New York: Water pipe, 6-in. and larger, $47.60 to $48.60; 4-in. and 5-in., $52.60 to $53.60; 3-in., $62.60 to $63.60; Class A and gas pipe, $5 extra.

Warehouse Business.—Demand for shipment from stock has been increasing since the first of the month, and except for a slight decline in activity around the Easter holidays, the volume of business has been considerably larger than at any time in March. Purchases of structural material are running into sizable tonnages, in addition to the usual lots of 4 to 5 tons. Sheet buying is good, and prices are firm on black, galvanized and blue annealed. Zinc sheets have been reduced from 12.75c. to 13c. per lb. to 12c. to 12.25c. per lb., base.

Reinforcing Bars.—No particularly large contracts for bars have been reported let in the last few days. A warehouse in Manhattan on which estimates have just been prepared will require 300 tons, and a factory building in Long Island City will take 275 tons. The volume of small orders is somewhat greater than was the case earlier in the month, but business is not yet up to seasonal expectations. Prices are unchanged.

Prices per lb. on billet steel reinforcing bars: From mill, 2c. Pittsburgh. Out of New York warehouse, 3.15c., delivered at job. Out of Youngstown warehouse, 2.50c., Youngstown, or 2.87½c., delivered New York.

Coke.—Purchasing is still confined to occasional carload lots of foundry grade, and prices are soft. Standard foundry continues at $4.50 to $5 per ton, Connellsville, with $4.25 obtainable on distress lots. Standard furnace is $3.50 to $3.75 per ton, Connellsville, with $3.25 occasionally quoted on prompt carloads. Delivered prices for foundry coke are: To northern New Jersey, $8.53 to $9.03; New York or Brooklyn, $9.29 to $9.79; Newark or Jersey City, N. J., $8.41 to $8.91 per ton. By-product foundry coke ranges from $9.59 to $10.77 per net ton, delivered Newark or Jersey City, N. J.

Old Material.—The market is generally inactive, with only a moderate volume of heavy melting steel and blast furnace material being purchased for delivery to eastern Pennsylvania consumers. No. 1 heavy melting steel continues unchanged at $14.50 per ton, delivered, and borings and turnings are still being bought by brokers with contracts at $10.50 to $11 per ton, delivered. Specification pipe has been purchased at $13 per ton, delivered to a consumer at Columbia, Pa. and at $13.50 per ton, delivered Lebanon, Pa. Foundry stove plate continues quiet, with most shipments going to a Bridgeport, Conn., consumer at $12 per ton, delivered. A West Mahwah, N. J., user of stove plate recently closed on a few carloads, for which brokers paid $11.75 per ton, delivered.

Dealers' buying prices per gross ton, New York:

No. 1 heavy melting steel	$11.00 to $11.85
Heavy melting steel (yard)	8.25
No. 1 heavy breakable cast	11.75 to 13.00
Stove plate (steel works)	8.50 to 9.00
Locomotive grate bars	9.00 to 10.00
Machine shop turnings	7.50 to 8.00
Cast borings (blast furnace or steel works)	8.00 to 8.50
Mixed borings and turnings	7.50 to 8.00
Steel car axles	16.00 to 16.50
Iron car axles	24.00 to 24.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25 to 9.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.50
No. 1 yard wrought, long	11.50 to 12.50
Rails for rolling	11.50 to 12.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	9.75 to 10.00
Malleable cast (railroad)	11.75 to 12.25
Cast borings (chemical)	12.50 to 13.00

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$15.00 to $15.50
No. 1 heavy cast (columns, building materials, etc.), cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	12.50 to 13.00

Cleveland

Steel Specifications from Automobile Industry Decline—Ore Active

CLEVELAND, April 19.—The demand for finished steel is fair, the volume being about the same as early in the month after the slowing down from the activity that prevailed in March. There has been quite a falling off in tonnage from the automotive industry. Some of the Michigan automobile plants are operating at full capacity, some are doing fairly well and two are still at low production. It is believed that the industry is now at its peak production for the year, and with the present large output of cars, some retrenchment is looked for in the next few weeks. Automobile companies are not ordering steel so far ahead as a month ago, evidently with the view of not having excessive stocks when the time comes for curtailing production schedules. This is particularly noticeable in the slackening of orders for sheets.

Steel bars are moving quite well in small lots, and some round-lot business was placed during the week by one of the large automobile companies. Plates are in steady demand, but mostly in small lots. The 2000 tons of plates for a water line in Boston has been placed with a Pittsburgh district mill by the Biggs Boiler Works Co., Akron, which was recently awarded the contract. Structural material is in light demand in this territory, and little fabricated work is coming out in Detroit. In Buffalo a city hall and a New York Central depot, for which plans are expected out shortly, will each require 5000 tons.

The market has a firm tone on most products. On steel bars there is still evidence that 1.90c., Cleveland, is being shaded occasionally. Outside mills are holding to 1.90c., Pittsburgh. Plates and structural material are firm at 1.90c., Pittsburgh.

Ore Consumption.—The consumption of Lake Superior ore during March was 5,031,196 gross tons, a gain of 797,333 tons over February. The amount consumed in March last year was 5,159,779 tons. Furnace stocks April 1 were 19,568,838 tons, and the amount on hand at furnaces and Lake Erie docks on that date was 24,808,525 tons, as compared with 22,610,228 tons on April 1 last year. There were 186 furnaces that use Lake ore in blast March 31, a gain of seven for the month. The vessel rates on ore that prevailed last year have been reestablished. The rate from the head of the Lakes to Lake Erie ports is 70c. per ton.

Pig Iron.—The market still shows some activity, largely in fill-in orders, and sales by Cleveland interests during the week covering a wide territory aggregated about 15,000 tons, or the same as during the previous week. Included in the sales was a 2000-ton lot placed in the Buffalo territory, another for 1500 tons and a third for 1000 tons. In the Cleveland territory the market is very dull, the only purchase of any size being a 500-ton lot taken by a Bedford foundry. Consumers are showing no interest in the third quarter, and producers are not trying to make sales for that delivery. Prices show no change. Prices on foundry and malleable iron made by Lake Erie producers ranged from $18.50 to $19, furnace, depending on location and

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.75c. to 3.00c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-rolled strip	*5.95c.
Black sheets (No. 24)	3.65c.
Galvanized sheets (No. 24)	4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base, per keg	2.90

*Net base, including boxing and cutting to length.

competitive conditions. This range does not include prices in Michigan where $19.50, furnace, is the ruling quotation. In the Valley district $18.50, furnace, is commonly quoted. For Cleveland delivery the market is unchanged at $19.50, furnace. While shipping orders are holding up well, April shipments by some of the furnaces are expected to fall below those of March. The automotive industry is taking iron in as heavy volume as last month. There is some slackening in the demand from foundries making oil country products.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25		$20.00
Southern fdy., sil. 1.75 to 2.25	$24.00 to	24.50
Malleable		20.00
Ohio silvery, 8 per cent		31.50
Basic, Valley furnace		19.00
Standard low phos., Valley fur.	27.50 to	28.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—The market has been fairly active since the reestablishment of last season's prices. Sales during the week included one lot of 85,000 tons, another of 40,000 tons and a third of 50,000, the last named being manganese ore that was purchased by an Eastern consumer. Several of the open market buyers have purchased approximately 80 per cent of their expected ore requirements for 1927 and will make additional purchases later in the season if they find that they will need more ore. Consumers having long term contracts have closed for nearly the maximum amount of their contracts for the year. Purchases by the Ford Motor Co. totaled approximately 365,000 tons, against its inquiry for 385,000 tons. It did not purchase one grade for which it inquired in a small amount. The ore shipping season opened with the dispatch of the first cargo from Escanaba Sunday. The first cargo from the head of the Lakes was scheduled to be shipped today.

Sheets.—New business is rather light. There has been a falling off in tonnage from the automotive industry, particularly in automobile body sheets. With less business on their books, some of the Ohio mills have curtailed production. A slowing down of the demand is reflected in a weaker situation on black sheets for early shipment, which are selling as low as 2.65c., Pittsburgh. For future delivery the price is unchanged at 2.75c. to 2.80c. Blue annealed sheets are firm at a minimum of 2.15c., Pittsburgh. Galvanized sheets are rather weak, with prices ranging from 3.65c. to 3.75c., Ohio mill. Jobbers are selling car lots at 3.70c., mill.

Strip Steel.—New demand for cold-rolled strip is not active, but some of the mills still have good bookings on old orders. The plan adopted by some of the mills several weeks ago of having a price range of 3c. to 3.25c., depending on the size of the order, has not withstood the test of keen competition, and 3c., Cleveland, the round lot price, has become the ruling price for small lots. New business in hot-rolled strip is light, but prices are being well maintained.

Reinforcing Bars.—Several local jobs will come out shortly requiring approximately 2000 tons, but current sales are light. Rail steel bars are unchanged at 1.75c. to 1.80c., mill.

Warehouse Business.—Sales of nearly all forms of steel show a gain over March. Steel bars are in good demand. Plates are moderately active and structural material, still rather quiet. Sheets are also showing more activity than last month. Prices are firm.

Semi-Finished Steel.—Slowing down in the demand for sheets is being reflected in specifications for sheet bars, which are not so heavy as a few weeks ago, and a local mill that for some time operated all of its 14 open-hearth furnaces has reduced operations to 10 furnaces. The demand for billets and slabs holds up to recent volume. Sheet bars are holding firm to $34, Cleveland and Youngstown, but some irregularity is reported on billets and slabs. Consumers of wire rods in this territory are placing specifications against contracts taken at $43, Cleveland, in spite of reports of lower prices in the Pittsburgh territory.

Coke.—The market has a rather weak tone, particularly on foundry heating coke, which ranges from $3 to $3.25, ovens. Standard Connellsville foundry coke is unchanged at $4.25 to $5.35, ovens. The market is dull.

Fluorspar.—Recent sales have been limited to car lots, which are being taken at $18 per ton, mines, for the gravel material. Leading producers are holding to that price in spite of reports of concessions.

Bolts, Nuts and Rivets.—While orders for bolts, nuts and rivets are fair, they have not been so heavy so far this month as during March. Most consumers are under contract. One local jobber is selling bolts at the regular manufacturers' discount of 70 per cent for full case lots.

Old Material.—The market is weak and very dull. Blast furnace scrap is moving in fair volume on old orders, but mills in this district are taking very little steel-making scrap. With reduced operations, some of the Valley mills are restricting shipments. Blast furnace scrap brought $11.25 from dealers during the week, but they are now trying to buy at $11. Heavy melting steel has declined 50c. a ton, purchases by dealers of No. 1 material being reported at $14.50. Machine shop turnings have been sold locally at $9.25 for Youngstown delivery. Drop forge flashings have declined sharply because of the absence of a local demand. Yard dealers have been accumulating considerable scrap recently, and some now have their yards well filled.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$14.50 to	$14.75
No. 2 heavy melting steel	13.75 to	14.00
Compressed sheet steel	14.00 to	14.25
Light bundled sheet stampings	12.00 to	12.50
Drop forge flashings	12.50 to	13.00
Machine shop turnings	9.00 to	9.25
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	14.50 to	15.00
No. 1 busheling	12.50 to	12.75
Pipes and flues	10.00 to	10.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phosphorus forging crops	16.50 to	17.00
Low phosphorus, billet bloom and slab crops	17.00 to	17.50
Low phosphorus sheet bar crops	16.00 to	16.50
Low phosphorus plate scrap	16.00 to	16.50
Blast Furnace Grades		
Cast iron borings		11.25
Mixed borings and short turnings		11.25
No. 2 busheling		11.25
Cupola Grades		
No. 1 cast	16.50 to	17.00
Railroad grate bars	12.00 to	12.50
Stove plate	12.00 to	12.50
Rails under 3 ft	18.00 to	18.50
Miscellaneous		
Railroad malleable	15.50 to	16.00
Rails for rolling	16.25 to	16.50

Joseph T. Ryerson & Son, Jersey City, N. J., have removed their export machinery office in New York, from 30 Church Street to the new Graybar Building, 420 Lexington Avenue. Paul Peterson continues in charge of machinery exports. Iron and steel sales will, in the future, be handled from the warehouse in Jersey City.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.80c. to 3.00c.
Plates, ⅛-in.	3.00c. to 3.20c.
Structural shapes	2.65c. to 3.00c.
Soft steel bars, small shapes and iron bars (except bands)	2.70c. to 3.20c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	3.00c.
Cold-finished steel, rounds and hexagons	4.00c.
Cold-finished steel, squares and flats	4.50c.
Steel hoops	3.85c. to 4.15c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.60c. to 3.90c.
Spring steel	5.00c.
Black sheets (No. 24)	4.15c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.30c.
Diamond pattern floor plates—	
¼-in.	5.30c.
⅛-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Philadelphia

Sales of 15,000 to 20,000 Tons of Basic Pig Iron—Steel Market Quiet

PHILADELPHIA, April 19.—Except for sales of 15,000 or 20,000 tons of basic pig iron to two Eastern steel companies there has been no outstanding activity in any branch of the iron and steel market in the past week. There is a fairly even flow of small orders for steel, and in some products the total volume approximates that received by the mills last month; in a few lines, however, there is a slowing up amounting almost to dullness. Sales agents for steel mills see little or no prospect for an increase in the rate of buying within the near future. The steel price situation continues spotty, with the most pronounced weakness in sheets, which have failed to maintain the slightly higher level they reached last month. The seasonal demand for structural steel seems to be tapering off, new projects of size in this district being fewer than a month or so ago.

Pig Iron.—Two Eastern plate mills have bought basic pig iron, one taking 10,000 to 15,000 tons and the other 5000 tons for early delivery. Prices paid were about the same as applied to the last previous purchases made by these companies, confirming the range of $20.75 to $21.25, delivered, which THE IRON AGE has published in recent weeks as representing the market on this grade. Sales of foundry iron are few and usually small. Some of the furnaces are more actively seeking tonnage, especially for third quarter, but consumers are taking very little interest as yet in anticipating their requirements that far ahead. Only a small amount of iron has been sold for delivery after July 1. Prices for foundry iron remain firm on the basis of $21, base, at furnace. The coal strike is exerting no discernible influence on the situation. Foreign iron is not an important factor in the local market, except for English low phosphorus, which is being offered more freely at $25, duty paid, Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.76 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X	22.76 to 23.26
Basic (delivered eastern Pa.)	20.75 to 21.25
Gray forge	21.00 to 21.50
Malleable	22.50 to 23.00
Standard low phos. (f.o.b. New York State furnace)	25.00
Copper bearing low phos. (f.o.b. furnace)	25.00 to 26.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.67
Virginia No. 2X, 2.25 to 2.75 sil.	27.17

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $5.17 from Virginia furnaces.

Billets.—Small sales of billets have recently been made at $34, Pittsburgh, for rerolling quality and at $40, Pittsburgh, for forging quality.

Plates.—Business in plates is perhaps a shade less active, but operations of Eastern mills continue at somewhere near 50 to 60 per cent. There is no marked weakness in prices, but sales at 1.85c., Pittsburgh, are reported as more frequent, and some of the larger lots to preferred buyers are going at 1.80c. On miscellaneous lots the usual quotation is 1.90c.

Structural Material.—While building operations in Philadelphia have not been conspicuously large at any time this spring, the tendency now seems to be toward a decline in the number of new projects coming on the market and most of those reported are for relatively small tonnages. Sales of plain material in carload lots are being made at 1.80c. to 1.90c., Pittsburgh, but on the more attractive tonnages special prices continue to apply.

Bars.—Manufacturing consumers are taking steel bars at a fairly good rate this month, comparable at least with the volume booked in March, but the demand still falls short of being sufficient to give the mills full rollings. Quotations, except to buyers in the preferred class, are usually 1.90c., Pittsburgh. Concessions, when granted, are seldom more than $1 a ton. Bar iron remains at 2.12c. to 2.22c., Philadelphia.

Sheets.—Prices quoted on the larger lots of sheets have settled to the bases which were in effect before the slightly upward trend of last month. Blue annealed sheets are now 2.15c. to 2.20c., Pittsburgh; black sheets are 2.75c. to 2.80c. and galvanized sheets, 3.60c. to 3.65c. Although some mills continue to quote higher than the maximums mentioned, they are getting very little business.

Imports.—Only 10 tons of pig iron came in at Philadelphia last week, that being from Scotland. Other imports were: 550 tons of structural shapes from Belgium; 52 tons of steel bars from the Netherlands and 5 tons from Belgium; 9100 tons of iron ore from Algeria, 1600 tons of chrome ore from Greece and 2507 tons of manganese ore from British West Africa.

Old Material.—A continued large supply of all grades of scrap and efficient transportation in moving it from points of origin to consumers, keep prices at low levels. Consumers have no difficulty in obtaining supplies as they need them, with the result that hand-to-mouth buying is becoming more prevalent in the scrap market, as it is in steel and some other commodities. Purchases of large tonnages by Eastern mills are becoming less frequent. The only price changes of the week are in bundled sheets, machine shop turnings, stove plate, grate bars, shafting and steel axles, all of which are downward.

Prices per gross ton, delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$14.50 to $15.00
Scrap T rails	14.00 to 14.50
No. 2 heavy melting steel	12.00 to 13.50
No. 1 railroad wrought	16.50 to 17.00
Bundled sheets (for steel works)	11.00 to 11.50
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equivalent)	13.50 to 14.00
Cast borings (for steel works and rolling mill)	12.00 to 13.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., heavy, 0.04 per cent and under	19.00 to 19.50
Couplers and knuckles	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.50 to 12.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Shafting	18.00 to 19.00
Steel axles	19.00 to 20.00
No. 1 forge fire	12.00 to 12.50
Steel rails for rolling	16.50 to 17.00
Cast iron carwheels	16.00 to 16.50
No. 1 cast	17.00 to 17.50
Cast borings (for chemical plant)	15.00 to 16.00

Steel Freight Rate Hearing Resumed

COLUMBUS, OHIO, April 19.—Advocating an advance in iron and steel freight rates for intra-state short hauls in northeastern Ohio to place them on the same basis with both interstate and intra-state rates in western New York, western Pennsylvania and northwestern West Virginia, V. C. Williams, assistant freight traffic manager Pennsylvania Railroad, occupied the greater part of both morning and afternoon sessions in testifying when the general investigation into iron and steel freight rates in Official Classification territory was resumed today in the United States District Court room in this city. Commissioner Johnston B. Campbell of the interstate commerce commission presided at the sessions which were attended by more than 150 representatives of iron and steel producers, consumers and steam carriers.

H. E. Stiffler, traffic manager Marion Steam Shovel Co. testified in behalf of the Manufacturers Association of Central Ohio, alleging discrimination against the consumers of iron and steel in central Ohio in favor of competitors in Indiana and Illinois. Charles F. Heise, Pollak Steel Co., Cincinnati, and W. P. Tingley, West Virginia Rail Co., Huntington, W. Va., asked for the removal of discriminatory rates from Marion, Ohio, and Huntington, W. Va., respectively, to consuming points.

A. H. Brown, assistant traffic commissioner Cleveland Chamber of Commerce, pointed out that the position of Cleveland in shipping iron and steel products to eastern and seaboard centers is disadvantageous under present conditions.

St. Louis

Pig Iron Buyers Cautious—Heavy Rains Slow Up Steel Trade

ST. LOUIS, April 19.—Scattered purchases of pig iron during the past week totaled about 4000 tons, of which 1000 tons was carwheel iron and 1000 tons, basic. With but one exception, the orders called for prompt shipment. Buyers are taking a conservative view and are only purchasing iron to match orders booked for their products. The melt, however, is well maintained, and shipping schedules are moving forward in satisfactory proportions. No inquiries of size are current, and it requires frequent calls to effect sales. Prices are unchanged, with the local producer asking $20.50 to $21, f.o.b. Granite City.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.50 to $21.00
Northern No. 2 fdy., delivered St. Louis	22.16
Southern No. 2 fdy., delivered	22.42
Northern malleable, delivered	22.16
Northern basic, delivered	22.16

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Old Material.—The market continues dull, with prices tending downward. Consuming industries are for the most part well supplied and are only taking tonnages that they regard as extraordinary bargains. Dealers are taking a pessimistic view of the situation and are buying little for their yards. Yard operations have been curtailed, and in one instance have been suspended because of high water. Railroads continue to dump scrap on the market, lists before the trade including the following: Chicago & Alton, 200 tons; Burlington, 1650 tons; Gulf Coast Lines, 2200 tons; Illinois Central, 9200 tons; St. Louis-San Francisco, 200 tons; Missouri Pacific, 300 tons; Wabash, 1300 tons; Chesapeake & Ohio, 9400 tons; Southern, 8500 tons; Louisville & Nashville, 10,000 tons, and Terminal Railroad Association of St. Louis, 2700 tons.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$12.25 to $12.50
Heavy shoveling steel	12.25 to 12.50
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	8.50 to 9.00
No. 2 railroad wrought	12.25 to 12.50
No. 1 busheling	10.00 to 10.50
Cast iron borings	9.00 to 9.50
Iron rails	14.00 to 14.50
Rails for rolling	14.50 to 15.00
Machine shop turnings	9.50 to 10.00
Steel car axles	19.00 to 19.50
Iron car axles	23.00 to 23.50
Wrought iron bars and transoms	19.50 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Steel rails, less than 3 ft	16.00 to 16.50
Steel angle bars	13.50 to 14.00
Cast iron carwheels	14.50 to 15.00
No. 1 machinery cast	18.00 to 18.50
No. 1 railroad cast	15.50 to 16.00
Railroad malleable	14.00 to 14.50
Agricultural malleable	13.50 to 14.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Finished Iron and Steel.—The Missouri Engineering & Contracting Co., with a bid of $644,044, was the low bidder on a sedimentation basin for the St. Louis Water Works System. For water works improvements there is still about $700,000 worth of work to be let, including a clear water basin and a secondary coagulant basin. Generally structural iron and steel business is light, consisting chiefly of small scattered jobs. Warehouse business has been slowed down by incessant rains and flooded rivers. Outdoor work has been held up, and the movement of goods to the country is below the seasonal average. Reinforcing material is fairly active, but demand for the general run of wire and wire products is dull. Tank plates and sheets are steady in a moderately active market.

Coke.—The coal strike has failed to stimulate purchasing of coke, though there have been a few recent inquiries covering contracts for extended deliveries. Melters are well supplied with contract coke and have liberal stock piles. The by-product ovens continue to operate at capacity and are beginning to show liberal accumulations of domestic sizes.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.60c.
Boiler rivets	3.80c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller	70
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped	60
Hot-pressed nuts, hexagons, blank or tapped	60

San Francisco

Pan-American Company Places 9160 Tons of Plates—Steel Buying Is Heavier

SAN FRANCISCO, April 16 (*By Air Mail*).—Outstanding among developments during the past fortnight have been a placing of 9160 tons of plates for tank work by the Pan-American Petroleum & Transport Co., Los Angeles; rejection of bids, because of a technicality, on 5000 tons of plates for a municipal gas holder of 10,000,000-cu. ft. capacity for the city of Long Beach, Cal., on which new bids will be taken April 18; the arrival at this port of 800 tons of Belgian steel, of which 500 tons was reinforcing bars and 200 tons, small structural shapes, and a notable increase in buying in practically all departments of the market.

In Los Angeles, plans are being prepared by Ralph Bennett, 1125 Central Building, for the appropriation of 5000 acre ft. of water for annual storage from Big Rock Creek in Los Angeles County for the purpose of irrigating about 3000 acres of land. Construction work on this project includes 10 miles of canals and also a 30-in. pipe line. The estimated cost is $250,000. The Los Angeles County Flood Control District is preparing plans for the construction of a concrete mass-type dam in San Gabriel Canyon, 10 miles north of Azusa, Los Angeles County, for the storage of 180,000 acre ft. of water. The total estimated cost of this project is $25,800,000.

Pig Iron.—Buying is confined to routine requirements. Most of the principal local users have covered their needs for the second quarter. Quotations are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Total lettings in fabricated steel during the past two weeks amount to over 6274 tons. Fresh inquiries call for nearly 1900 tons. The largest individual awards were two projects of 1500 tons each. One of them, a warehouse for the United States Steel Products Co., Portland, Ore., was placed with the American Bridge Co., and the other, an addition to a bank building in Los Angeles, was taken by the Llewellyn Iron Works of that city. Among fresh inquiries, the largest is 800 tons for a Y. M. C. A. hotel building in San Francisco. Eastern mills continue to quote plain material at 2.35c., c. i. f. Coast ports.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Small angles, ⅞-in. and over	3.00c.
Small angles, under ⅞-in.	3.40c.
Small channels and tees, ¾-in. to 2¾-in.	3.60c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.70c.
Common wire nails, base per keg	$3.75
Cement coated nails, 100-lb. keg	3.75
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.25c.

Plates.—The Pan-American Petroleum & Transport Co., Los Angeles, has placed 9160 tons as follows: 200 tons for small tank work to an unnamed Los Angeles fabricator, and 8910 tons for 24 100,000-bbl. tanks to the Western Pipe & Steel Co. and the Llewellyn Iron Works, Los Angeles. The California Petroleum Corporation, Oakland, Cal., has taken bids on 375 tons for tank work, and in Los Angeles, Geo. F. Getty has taken bids on 620 tons for two 80,000-bbl. tanks. While most of the Eastern mills quote plates at 2.30c., c. i. f. Coast ports, there have been few real tests of prices. It is understood that less than 2.30c. has been done on some large business.

Bars.—Local concrete bar jobbers during the past two weeks have booked over 700 tons, and fresh inquiries call for about 600 tons. A good deal of work is being figured, but lettings of 100 tons and over have been relatively few. The largest individual letting of the past fortnight, 225 tons for the Hoquiam River bridge at Hoquiam, Wash., was taken by the Northwest Steel Rolling Mills, Inc., Ballard, Wash. Local reinforcing bar jobbers quote as follows: 2.85c., base, per lb. on lots of 200 tons, and 3.10c., base, on less-than-carload lots.

Cast Iron Pipe.—Activity in cast iron pipe during the past two weeks has resulted in bookings of over 4400 tons. Fresh inquiry calls for more than 10,000 tons. Outstanding awards include the following:

San Diego, Cal., 586 tons, street improvement work on Broadway Extension, to an unnamed company.
Santa Ana, Cal., 204 tons, 14 and 20-in. Class B, to National Cast Iron Pipe Co.
San Diego, Cal., 233 tons, improvements Emerald Street, to E. Paul Ford, San Diego.
Los Angeles, 1188 tons, as follows: 475 tons, 8-in. Class B, to B. Nicoll & Co., and 713 tons, 8-in. centrifugal, to American Cast Iron Pipe Co.
Benson, Ariz., 233 tons, 4 and 6 in. Class B, to R. H. Martin, Tucson, Ariz.
Los Angeles, 465 tons, as follows: 374 tons, 8 and 16-in. Class B, to the Grinnell Co. of the Pacific, and 91 tons of 12-in. centrifugal to American Cast Iron Pipe Co.
Monterey Park, Cal., 549 tons, 4, 6 and 8-in. Class B and No. 150 centrifugal, to American Cast Iron Pipe Co.
San Diego, Cal., 690 tons for street improvement work to unnamed companies.
Seattle, Wash., 156 tons for street improvement work to unnamed companies.
Los Angeles, 108 tons, for Jefferson Strom Drain System, to unnamed company through general contractor.

Fresh inquiries include the following:

Arcadia, Cal., 564 tons; bids to be taken soon.
Long Beach, Cal., 3700 tons, 6, 8, 12, 16 and 20-in. Class B; bids in.
San Diego, Cal., 255 tons, 6, 8, 12-in., Classes B and C; bids April 25.
Tacoma, Wash., 286 tons, 6, 8, 10, 12 and 16-in., Classes B and C; bids in.
Mountain View, Cal., 143 tons; no date set for bids.
Portland, Ore., 1167 tons, 2 to 8-in.; bids in.
Fresno, Cal., 390 tons, 12-in. Class B, California Water Corporation; bids in.

Steel Pipe.—The Grinnell Co. of the Pacific has taken 3786 tons of 2 to 16-in. buttwelded and line pipe for the Los Angeles Gas & Electric Co., Los Angeles. The Rockwood Water District, Portland, Ore., is in the market for about 506 tons of 2, 3, 4, 6 and 8-in. pipe, and the Ramona Irrigation District, Ramona, Cal., is inquiring for 270 tons of 2½-in. standard pipe.

Warehouse Business.—Buying is limited to routine requirements. Quotations are unchanged.

Rails and Track Supplies.—The Los Angeles County Flood Control District, Los Angeles, has placed 1800 tons of 70-lb. relaying rails with G. Weisbaum, Los Angeles. Bids will be taken April 18 in Los Angeles by the Los Angeles County Board of Supervisors on the following: 90,000 tie plates, 5½ x 8 in.; 56 kegs of track bolts; 75 kegs of track spikes; 26 sets of frogs and switches and one tongue and mate switch.

Coke.—Sales are limited to small lots. Local users are well covered on their second quarter requirements with few exceptions. Fresh shipments from Europe are expected about May 1. Importers quote on specific inquiries only.

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	4.05c.
Squares and flats	4.55c.
Toe calk steel	6.00c.

Boston

Buffalo Furnace Makes Sales of Pig Iron for Third Quarter—Scrap Is Soft

BOSTON, April 19.—A Buffalo producer of pig iron has opened books for third quarter business at $18 a ton, base furnace, for foundry grade. Its local representative has taken orders for about 2000 tons. Otherwise, little business was transacted in New England in the past week, and no change is noted in prices. A furnace east of Buffalo is negotiating with a foundry on a round tonnage, which it expects to close within a day or two, for second and third quarter delivery. Local pig iron houses are considerably disturbed by an unconfirmed report that the American Radiator Co. has taken, or is about to take, over the business of the H. B. Smith Co., Westfield, Mass., manufacturer of heaters. The Westfield company is one of the largest New England pig iron consumers and, in the event of being taken over by the American Radiator Co., presumably would be supplied with pig iron from that company's own furnace.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$22.41 to $22.91
Buffalo, sil. 2.25 to 2.75	22.91 to 23.41
East. Penn., sil. 1.75 to 2.25	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75	24.65 to 25.15
Virginia, sil. 1.75 to 2.25	27.42
Virginia, sil. 2.25 to 2.75	27.92
Alabama, sil. 1.75 to 2.25	24.91 to 26.77
Alabama, sil. 2.25 to 2.75	25.41 to 27.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.92 from Virginia, $6.91 to $8.77 from Alabama.

Finished Material.—Specifying against old contracts for bars, shapes and plates is not very active, and new bookings are small. Prices remain unchanged. Most of the business taken by steel fabricators in the past week averaged less than 50 tons per order, some of it running as low as 1 ton. New England fabricating plants have only two or three weeks of business on their books. Demand for reinforcing steel is developing more slowly than was expected.

Coke.—A New York State by-product plant that heretofore has confined its output to domestic fuel plans to produce by-product foundry coke and is soliciting orders in New England for coke in foundry sizes at $7.50 a ton, ovens. On that basis the coke costs $10.40 a ton, delivered Boston, contrasted with $12.50 a ton, as quoted by the New England Coal & Coke Co. and the Providence Gas Co. Good Connellsville foundry coke is offered at $5.25 to $5.50 a ton at ovens, or $10.79 to 11.04, delivered in New England. New Jersey coke is also offered here at delivered prices slightly above and below that for the New England product. All producers, including the New England Coal & Coke Co. and the Providence Gas Co., report business as quiet. The increase in specifications against contracts noted a week ago proved to be only a flurry.

Cast Iron Pipe.—Newton, Mass., has awarded 600 tons of 16 to 24-in. pipe to the Warren Foundry & Pipe Co. The Metropolitan District Water Board, Boston, has decided to use concrete instead of cast iron pipe on its new project and has awarded a contract for concrete pipe to the Lock Joint Pipe Co. Providence, R. I., will close bids April 25 for approximately 400 tons of 6-in. pipe, and Beverly, Mass., will receive tenders on April 26 for 200 tons of 6 to 12-in. pipe. A fairly large tonnage of pipe business was placed privately in the past week. Further large tonnages are in the prospect, but details have not been announced. All of the pipe foun-

dries are well sold for the first half of the year. Prices on small pipe remain firm, while those on large sizes are unsettled. Prices quoted openly on domestic pipe are: 4-in., $58.10 a ton, delivered common Boston freight rate points; 6 to 12-in., $53.10 to $54.10; larger pipe, $52.10 to $53.10. A $5 differential is asked on Class A and gas pipe.

Old Material.—Textile machinery cast is more plentiful than it has been in several years, because additional textile plants are scrapping their equipment. The best lots are offered at $17.50 a ton, delivered, and ordinary lots at $17, but slightly lower prices have been named where a small freight rate exists. Demand for textile and machinery cast is light, however, as most foundries contracted for supplies some time ago. The market for steel mill scrap is quiet and easier, with $10.25 a ton on cars now the top price on heavy melting steel, contrasted with $10.50 a week ago. The best price offered for steel turnings today appears to be $6.50 a ton; speculators that heretofore paid a little more have withdrawn prices. In contrast with the general market trend, quotations on railroad and yard wrought are a little stiffer as a result of a slightly larger buying movement.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.00 to $10.25
Scrap rails	9.75 to 10.00
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.25
Machine shop turnings	6.25 to 6.50
Cast iron borings (steel works and rolling mill)	7.00 to 7.50
Bundled skeleton, long	7.00 to 8.00
Forged flashings	7.50 to 8.00
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap	6.50 to 7.00
Shafting	14.50 to 15.00
Street car axles	17.00 to 18.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	8.50 to 9.00
Rails for rerolling	11.00 to 11.50
Cast iron borings, chemical	10.50 to 11.00

Prices per gross ton, delivered consumers' yards:

Textile cast	$17.00 to $17.50
No. 1 machinery cast	16.50 to 17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Railroad malleable	16.00 to 16.50

Birmingham

Pressure Pipe Shops Pressed for Shipments—Steel Output Tapers

BIRMINGHAM, April 19.—Small-lot buying of pig iron is now the rule and promises to continue for some time to come. While production on the whole is unchanged, foundry iron output has been reduced somewhat by a Woodward furnace's going on to basic. There have been no additions to the surplus stocks of foundry iron on furnace yards for some time, and with an undiminished pressure for deliveries, it is expected that production will be continued at the present pace through the second quarter. Since it is still possible to obtain shipments almost on demand, melters do not see the need of buying in quantity against forward needs. A survey of consuming industries indicates that demand for their respective lines promises to improve. In virtually every instance, however, the complaint is made that present prices on manufactured products are too low. The strike in the coal fields of the Central West has had no effect in this district on the markets for pig iron, steel, coal and coke, and none is expected.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil.	$18.00 to $19.00
No. 1 foundry, 2.25 to 2.75 sil.	18.50 to 19.50
Basic	18.00
Charcoal, warm blast	29.00

Rolled Steel.—A reduction in ingot output in this district, while several open-hearth furnaces are out of commission does not reflect any curtailment in steel demand. Finishing mills are running at a high rate, and shipments are heavy. Fabricating shops are busy. Considerable tonnage is being moved to Texas, and further business in that State is in sight. Demand for rails, track accessories, plates and sheets is active. Further rail business is expected this year. The Reeves Brothers Co. has 6000 tons of steel tanks on the way to Port Arthur, Tex. The Virginia Bridge & Iron Co. will furnish structural steel for a telephone building in Texas. Other contracts call for considerable steel from this district. Prices are stronger on black sheets, which range from 3.10c. to 3.20c., base Birmingham.

Cast Iron Pipe.—Lettings have been numerous, and pressure pipe production is large. Prices are unchanged at $36 to $37, Birmingham, for 6-in. and larger diameters. A large tonnage of pipe has been shipped in the past two weeks, and much of the accumulated stock of the past six or eight weeks has been moved. The McWane Cast Iron Pipe Co. is building an addition to its shops. The soil pipe trade shows only slight improvement. Additions to some soil pipe shops are under construction.

Coke.—Not more than 200 by-product coke ovens in this district are out of commission, so that the statement that there has been a reduction in output because of warmer weather does not mean much. Foundry coke is still selling at $5.50 per net ton, Birmingham, and bee-hive coke, which is being made in less than 100 ovens, brings $6. Independent producers have no surplus coke. No emergency demand is expected by Alabama coal operators and coke manufacturers as a result of the tie-up in the Central States.

Old Material.—No improvement is reported in the market, though dealers are being kept busy preparing and delivering against old obligations. As in the past several weeks, heavy melting steel and No. 1 cast scrap are accounting for what little market activity there is. The steel manufacturers have not been in the market lately for any large tonnage. Quotations have not changed.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$12.00 to $12.25
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought	11.00 to 12.00
Rails for rolling	15.00 to 16.00
No. 1 cast	15.00 to 16.00
Tramcar wheels	15.00 to 16.00
Cast iron carwheels	14.00 to 15.00
Cast iron borings, chemical	13.00 to 14.00

Buffalo

Steel Production Well Maintained—Scrap Has Stronger Tone

BUFFALO, April 19.—The week has witnessed a little further strengthening of pig iron prices. The going market on foundry iron is now $18, base furnace, though $17.50 might be done on an attractive tonnage. The volume of business placed has not been large, and inquiries have been comparatively small. Business can be placed for third quarter at about the same figures as those quoted above with at least one furnace. This producer is also almost entirely obligated for second quarter.

Prices per gross ton, f.o.b. Buffalo furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.50 to $18.00
No. 2X foundry, sil. 2.25 to 2.75	18.00 to 18.50
No. 1X foundry, sil. 2.75 to 3.25	19.00 to 19.50
Malleable, sil. up to 2.25	17.50 to 18.00
Basic	17.00 to 18.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—With mill operations averaging 70 to 75 per cent, production of rolled products is well maintained. The going mill price on soft steel bars is 2.165c., Buffalo, and this figure also rules on plates and shapes. Sheet business has been good, with almost all users in the market for small tonnages. The volume of sheet business has been satisfactory, but prices are not much firmer. On No. 24

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.90
Black wire, base per 100 lb	3.90

gage black 2.80c. to 2.85c., base Pittsburgh, is being quoted. Business in reinforcing bars, which was in good volume last month, has fallen off extensively thus far in April. Very few jobs are being figured.

Old Material.—One mill is buying heavy melting steel on a basis of $15 to $15.50, and dealers are actively purchasing against old orders. In some cases No. 1 steel is costing the dealer $15.50 to $15.75. Buying of stove plate and No. 1 machinery cast scrap continues, and there is a sustained demand for turnings and borings. Altogether, scrap is somewhat scarce in this district. None of the material in recent railroad lists came here, and dealers are finding it difficult to fulfill their obligations. Dealers are changing their buying policy. Few of them now stock heavily as in the past. They buy as they get the orders and strive to eliminate the element of chance as much as possible. They contend that the more rigid inspection by consumers during the past few months has forced them to adopt this plan.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$15.50 to $16.00
No. 2 heavy melting steel	14.50 to 15.00
Scrap rails	16.00 to 16.50
Hydraulic compressed sheets	14.50 to 15.00
Hand-bundled sheets	11.00 to 11.50
Drop forge flashings	13.00 to 13.50
No. 1 busheling	14.50 to 15.00
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50
Acid Open-Hearth Grades	
Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Low phosphorus billet and bloom ends	17.50 to 18.00
Electric Furnace Grades	
Heavy steel axle turnings	14.00 to 14.50
Short shoveling steel turnings	11.50 to 12.00
Blast Furnace Grades	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	13.50 to 14.00
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.00 to 13.50
Cupola Grades	
No. 1 machinery cast	16.50 to 17.00
Stove plate	14.00 to 14.50
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	18.00 to 18.50
Cast iron carwheels	15.00 to 16.00
Malleable Grades	
Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Industrial	16.50 to 17.00

Cincinnati

Pig Iron Mart Dull as Melt Declines—Large Purchases of Heavy Melting

CINCINNATI, April 19.—Pig iron sales in the past week were the smallest this year. Lack of interest on the part of buyers is attributed to two causes, the reduction of manufacturing operations to a point where less iron is being consumed than melters had anticipated and the accumulation of stocks in sufficient quantities to take care of second quarter needs. Until the situation regarding the course of business in the near future is clarified, foundries and other purchasers of iron are unwilling to discuss third quarter requirements. Unless conditions improve during the next two months, considerable iron is likely to be carried over into July and August. In view of the adverse trend of business, it is not surprising that the pig iron market is exceptionally quiet. Bookings have consisted of unimportant lots ranging from single carloads up to 200 tons, and the only sizable inquiry before the trade calls for 500 tons of foundry iron for a melter nearby. Prices are unchanged, with southern Ohio foundry grades standing at $19.50, base Ironton, and Lake Erie iron at $18.50, base Cleveland. Alabama iron remains at $18, base Birmingham. Foundry iron from Tennessee is still on a basis of $18.50, Birmingham.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$21.39 to $21.89
So. Ohio malleable	20.64 to 21.89
Alabama fdy., sil. 1.75 to 2.25	21.69
Alabama fdy., sil. 2.25 to 2.75	22.19
Tennessee fdy., sil. 1.75 to 2.25	22.19
Southern Ohio silvery, 8 per cent	30.39

Freight rates: $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Specifiations and orders in the first half of April reached the high point for the year, according to several producers. Orders have been better distributed among all consuming industries than for many months. Consumers in some cases have allowed their stocks to dwindle until the current demands of their trade have forced them to replenish their supplies. It is not surprising, therefore, that a considerable portion of the business booked in the past week calls for quick delivery. Prices, in general, are firm. In the sheet market, producers are obtaining a fairly good tonnage from the Detroit district, and indications are that shipments to automobile makers will improve during the coming month. Automobile body sheets are steady at 4.15c., base Pittsburgh. The lessened activity of black sheets has not affected other grades, both galvanized and blue annealed having sold well. Quotations remain unchanged. Bars and structural steel are bringing 1.90c., base Pittsburgh, and orders have consisted almost exclusively of small lots from widely diversified sources. Fabricators are operating at a moderate rate on numerous jobs calling for less than 100 tons each. Wire products are slightly stronger. Jobbers are taking an increased amount of material, and consumers are accepting a fair tonnage. Common wire nails are being sold at about $2.72 per keg, delivered in Cincinnati, but some producers decline to accept less than $2.55, base Pittsburgh. An encouraging feature of the market has been liberal specifying for cold-rolled steel.

Reinforcing Bars.—The Pollak Steel Co. will supply 100 tons for the Wyoming School at Wyoming, Ohio. An award of about 1000 tons for new buildings of the Cincinnati Stockyards Co. is expected within the next two weeks. New billet bars are quoted at 1.90c., base Pittsburgh, but sellers are accepting business at $1 a ton under that figure. A similar situation exists in rail steel stock, for which mills are asking $1.80c., base mill. To secure orders some producers are dipping to 1.75c.

Warehouse Business.—A moderate amount of business has been booked in the past week by local jobbers. Despite the fact that the volume of orders has been maintained at a satisfactory level, the total tonnage still continues to be light. Structural steel and tank plates are active, but the market for reinforcing bars is dull. Prices are steady and unchanged.

Coke.—Weakness in both by-product and beehive coke disclosed last week has persisted during the past seven days. Foundry coke specifications are not up to the level anticipated by some dealers, while demand for domestic grades is lagging. Although by-product coke companies have bade no announcement regarding prices for next month, present quotations are not likely to be disturbed. A Cleveland consumer has bought 10,000 tons of by-proluct foundry coke from a local dealer for shipment over the remainder of the year.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates: $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The Portsmouth, Ohio, works of the

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	3.30c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	$3.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100 lb. keg	3.05
Chain, per 100 lb	7.55
	Net per 100 Ft.
Lap welded steel boiler tubes, 2-in.	$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

Wheeling Steel Corporation has purchased about 10,000 tons of heavy melting steel at $16.25, delivered. Substantial tonnages of material were sold by railroads during the past week, and in almost every case dealers are reported to have paid fairly good prices. Weakness has developed in borings and turnings, although generally quotations on all items are unchanged.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.00 to $13.50
Scrap rails for melting	13.50 to 14.00
Loose sheet clippings	9.50 to 10.00
Champion bundled sheets	10.50 to 11.00
Cast iron borings	10.00 to 10.50
Machine shop turnings	9.50 to 10.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	7.50 to 8.00
Rails for rolling	14.00 to 14.50
No. 1 locomotive tires	16.50 to 17.00
No. 1 railroad wrought	12.00 to 12.50
Short rails	17.50 to 18.00
Cast iron carwheels	13.00 to 13.50
No. 1 machinery cast	18.00 to 19.00
No. 1 railroad cast	14.50 to 15.00
Burnt cast	8.50 to 9.00
Stove plate	10.00 to 10.50
Brake shoes	10.50 to 11.25
Railroad malleable	14.50 to 15.00
Agricultural malleable	13.50 to 14.00

Toronto

Most Pig Iron Buyers Covered for Second Quarter—Scrap Less Active

TORONTO, ONT., April 19.—With the majority of melters covered for second quarter needs and with a steady flow of orders against contract appearing, the present demand for foundry and malleable iron is chiefly for small tonnages for spot delivery. Local blast furnace representatives, however, point out that the current demand on spot account is fairly good and that whereas individual orders averaged between 50 and 100 tons a month or six weeks ago, buyers on spot account are now ordering from 100 to 500 tons at a time. The daily melt is showing slow but steady improvement, and it is estimated that foundries throughout Ontario and Quebec are now operating at between 60 and 70 per cent on an average. Other consumers of pig iron also report better operating conditions. Pig iron producers are accepting all business offered but, taken as a whole, do not appear to be pushing for new business.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$24.10
No. 2 foundry, sil. 1.75 to 2.25	24.10
Malleable	24.10
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	26.50
No. 2 foundry, sil. 1.75 to 2.25	26.50
Malleable	26.50
Basic	25.50
Imported Iron at Montreal Warehouse	
Summerlee	36.00
Carron	36.00

Old Material.—The holiday season toward the end of last week had the effect of curtailing sales to some extent. Business, as a whole, however, is on a better footing than a month or six weeks ago, and dealers in both the Toronto and Montreal districts expect second quarter sales to run larger than those for first. Foundries, electric furnace operators and various other large consumers are buying more freely for future delivery, while at the same time the demand on spot account has also become better. Practically no change has featured the export sales in the Montreal district, although inquiries are somewhat better.

Dealers' buying prices:

	Toronto	Montreal
	Per Gross Ton	
Heavy melting steel	$10.50	$9.00
Rails	11.00	10.00
No. 1 wrought	11.00	14.00
Machine shop turnings	8.00	7.50
Boiler plate	8.00	8.00
Heavy axle turnings	8.50	8.50
Cast borings	8.50	7.50
Steel turnings	8.00	8.00
Wrought pipe	6.00	6.00
Steel axles	15.00	17.00
Axles, wrought iron	17.00	19.00
	Per Net Ton	
No. 1 machinery cast	16.00	18.00
Stove plate	10.00	13.00
Standard carwheels	14.00	16.00
Malleable scrap	14.00	14.00

Reduced Production in Youngstown Area

YOUNGSTOWN, April 19.—Iron and steel production schedules this week in the Youngstown area reflect the reaction which has set in from the heavy output maintained during the first quarter. While prices in rolled steel are still irregular, one of the leading independent interests states that there has been a substantial improvement in the strip market within recent weeks. New business, his interest advises, commands 2.10c. to 2.30c. for hot rolled, depending upon width, and comparing with a low during the first quarter of 1.85c.

While no orders have yet been received from the Ford Motor Co. for sheet steel under revised specifications for the new car to be brought out by this company, engineering departments of sheet makers are figuring specifications and other details.

The tin plate market exhibits some irregularity for this season, although it is now running into the heavy consumptive period, and mills anticipate steady engagement over the next few months. Following the completion of repairs and overhauling to its tin mills, the Trumbull Steel Co. is gradually enlarging production in this department again, and reports average schedules this week of 85 per cent, against 78 per cent the preceding week.

In the sheet division, the smaller, non-integrated producers are suffering from intermittency in requirements more than the larger interests, and schedules of such interests reveal considerable variation from week to week.

Of 53 independent open-hearth furnaces in the Mahoning Valley, 39 are active this week, against 42 the week before and a recent high of 45. Bessemer steel plant output is at 65 per cent. Of 127 Valley sheet mills, 96 are rolling, as compared with 106 the previous week, while 11 of 18 pipe mills are under power, against a recent average of 13.

Scrap Declines at Detroit

DETROIT, April 19.—Further declines were noted in the scrap market in this district during the past week, with heavy melting and shoveling steel, hydraulic compressed sheets, busheling and flashings registering a decline of 25c. per ton. The immediate future of the market will be influenced by the coal situation, principally with respect to the coke supply to the mills and furnaces and the tendency to increase the ratio of scrap in steel production.

	Per Gross Ton
Heavy melting and shoveling steel	$12.75 to $13.25
Borings and short turnings	8.75 to 9.25
Long turnings	7.75 to 8.25
No. 1 machinery cast	17.00 to 18.00
Automobile cast	19.00 to 20.00
Hydraulic compressed	11.25 to 11.75
Stove plate	13.50 to 14.50
No. 1 busheling	10.75 to 11.25
Sheet clippings	8.25 to 8.75
Flashings	11.00 to 11.50

Bookings of Commercial Steel Castings Lower in March

WASHINGTON, April 19.—Bookings of commercial steel castings in March amounted to 82,488 net tons, representing 62 per cent of capacity, as against 91,354 tons, or 69 per cent of capacity, in February. March production aggregated 97,256 tons, or 73 per cent of capacity, compared with 85,030 tons, or 64 per cent of capacity, in February. Reports were received by the Department of Commerce from 123 concerns with a monthly capacity of 133,000 tons, or more than 80 per cent of the capacity of the United States.

Of the March bookings, 31,380 tons consisted of railroad specialties. Being 52 per cent of this class of capacity, while 51,108 tons was for miscellaneous castings, or 70 per cent of this kind of capacity. Of the March production, 38,784 tons was railroad specialties, being 65 per cent of this kind of capacity, and 58,472 tons was miscellaneous production, being 80 per cent of this class of capacity.

The New York offices of the Trumbull Steel Co., Warren, Ohio, have been moved from 3846 Grand Central Terminal to 1244-45 Graybar Building, 420 Lexington Avenue.

FABRICATED STRUCTURAL STEEL

Oil Tanks and Steel Barges Figure Largely in Week's Awards—Inquiry Light

The largest structural steel award of the week was 8960 tons for oil tanks; 6400 tons will go into coal barges for a Pittsburgh coal company; a bridge over the Monongahela River at Clairton, Pa., will take 6000 tons; a New York hotel building requires 3000 tons. Other awards were smaller, but the total for the week is close to 48,000 tons. Inquiries are light, amounting only to a little more than 12,000 tons. Awards follow:

MEDFORD, MASS., 112 tons, theater, to New England Structural Co.

BANGOR, ME., 280 tons, Catholic high school, to an unnamed fabricator.

NEW HAVEN, CONN., 650 tons, Woolworth Store, to Levering & Garrigues Co.

NEW YORK, 140 tons, New York, New Haven & Hartford Railroad, bridge at Harlem River yards, to Bethlehem Fabricators, Inc.

NEW YORK, 3000 tons, hotel at 1 West Fifty-seventh Street, to Levering & Garrigues Co.

NEW YORK, 150 tons, subway construction in Queens, to American Bridge Co.

NEW YORK, 650 tons, Public School No. 30, to Bethlehem Fabricators, Inc.

NEW YORK CENTRAL LINES, 300 tons, bridge over Dyckman Street, New York, to Fort Pitt Bridge Co.

JERSEY CITY, N. J., 725 tons, Stanley Theater, to Belmont Iron Works.

CAMDEN, N. J., 275 tons, building for Sears, Roebuck & Co., to McClintic-Marshall Co.

KINGSTON, PA., 1100 tons, high school building, to an unnamed fabricator.

NORTHAMPTON, PA., 175 tons, building for Atlas Portland Cement Co., to a local fabricator.

SOUTHERN RAILWAY, 1000 tons, bridges, to Virginia Bridge & Iron Co.

COLOMBIA, S. A., 630 tons, six barges for International Petroleum Co., to Dravo Contracting Co.

PITTSBURGH, 6400 tons, 40 barges for Pittsburgh Coal Co., to Riter-Conley Co.

NEW KENSINGTON, PA., 3000 tons, bridge over Allegheny River, to American Bridge Co.

CLAIRTON, PA., 6000 tons, bridge over Monongahela River, to Fort Pitt Bridge Works.

SPRINGDALE, PA., 425 tons, substations for Duquesne Light Co., to American Bridge Co.

INDIANAPOLIS, 800 tons, Masonic Temple, to an unnamed bidder.

CHICAGO, 750 tons, viaduct for the Chicago & Western Indiana Railroad, to McClintic-Marshall Co.

DAVENPORT, IOWA, 1800 tons, American Commercial Savings Bank Building, to the Davenport Machine & Foundry Co.

AMES, IOWA, 800 tons, Memorial Building, to Pittsburgh-Des Moines Steel Co.

OMAHA, NEB., 1000 tons, building for the Omaha Gas & Electric Co., to Pittsburgh-Des Moines Steel Co.

LOS ANGELES, 240 tons, expansion joints for the Mono-Bear project for the Southern California Edison Co., to an unnamed local fabricator.

LOS ANGELES, 200 tons, small tanks for the Pan-American Petroleum & Transport Co., to an unnamed local fabricator.

LOS ANGELES, 8960 tons, 24 100,000-bbl. tanks for the Pan-American Petroleum & Transport Co., 12 tanks each to the Western Pipe & Steel Co., and the Llewellyn Iron Works.

REDWOOD CITY, CAL., 350 tons, plant for the Pacific Portland Cement Co., to Pacific Rolling Mill Co., San Francisco.

SANTA CLARA, CAL., 100 tons, warehouse for Libby, McNeil & Libby, to Pacific Rolling Mill Co.

LONG BEACH, CAL., 500 tons, apartment building, to Minneapolis Steel & Machinery Co.

SAN FRANCISCO, 375 tons, theater on Mission Street, to Dyer Brothers.

SAN FRANCISCO, 377 tons, apartment building, Chestnut and Larkin Streets, to California Steel Co., San Francisco.

SAN FRANCISCO, 300 tons, apartment building, Scott and Fulton Streets, to Dyer Brothers.

SAN FRANCISCO, 140 tons, building for the Western Can Co., 17th and Kansas Streets, to Dyer Brothers.

STOCKTON, CAL., 750 tons, gas holder for Byllesby Engineering & Management Corporation.

OLYMPIA, WASH., 582 tons, Hoquiam River Bridge, at Hoquiam, Wash., for the State Highway Commission, to Wallace Bridge & Structural Steel Co.

PORTLAND, ORE., 1500 tons, warehouse for United States Steel Products Co., to American Bridge Co.

PHILADELPHIA, 400 tons, addition to Philadelphia Gear Works, to American Bridge Co.

PENNSYLVANIA RAILROAD, 110 tons, bridge at Lewistown, Pa., to Bethlehem Steel Co.

PHILADELPHIA, 100 tons, Cobb's Creek bridge, to Bethlehem Steel Co.

TOLEDO, OHIO, 200 tons, Detroit Avenue bridge, to American Bridge Co.

ALTON, ILL., 5000 tons, two highway bridges across the Mississippi and Missouri Rivers, one to Wisconsin Bridge & Iron Co. and the other to Kansas City Bridge Co. Both bridges were previously reported awarded to the former company.

OKLAHOMA CITY, 1700 tons, Southwestern Bell Telephone Co. building, to Mississippi Valley Structural Steel Co.

Structural Projects Pending

BOSTON, 1300 tons, Young Women's Christian Association building.

SPRINGFIELD, MASS., 125 tons, hospital.

PROVIDENCE, R. I., 125 tons, grammar school on Veazie Street.

GREENSBORO, N. C., 1300 tons, municipal bridges.

ERIE RAILROAD, 275 tons, bridges.

HARFORD COUNTY, MD., 200 tons, highway bridge.

RICHMOND, VA., 325 tons, Loew's Theater.

WASHINGTON, 800 tons, Acacia Life Insurance Building.

ELKHART, IND., 600 tons, building for Adams & Westlake Co.

GARY, IND., 1700 tons, Gary State Bank.

CHICAGO, 600 tons, viaduct for the Santa Fe Railroad.

CHICAGO, 500 tons, hotel at Lawrence and Western Avenues.

DECATUR, ILL., 500 tons, Seventh Street viaduct.

FORT WORTH, TEX., 500 tons, bridge for the Texas & Pacific Railroad.

SHAKOPEE, MINN., 550 tons, highway bridge.

LONG BEACH, CAL., 5000 tons, 10,000,000-cu. ft. gas holder for the city of Long Beach; bids rejected on a technicality, new bids April 18.

MONTEREY PARK, CAL., 120 tons, welded steel pipe line; new bids opened April 18.

RAMONA, CAL., 109 tons, riveted steel pipe line; alternate bids on standard pipe and National tubing; bids April 19.

OAKLAND, CAL., 250 tons, high school, Park Boulevard and Hopkins Street; bids May 3.

OAKLAND, 300 tons, addition to plant of Pacific Gas & Electric Co., First and Grove Streets; bids to be called for in about one month.

OAKLAND, 200 tons, apartment building, Telegraph Avenue; bids April 20.

OAKLAND, 375 tons, tank work for California Petroleum Corporation; bids in.

SAN FRANCISCO, 800 tons, Y. M. C. A. hotel, Turk Street; bids in about two weeks.

SAN FRANCISCO, 150 tons, apartment building, Laguna and Sacramento Streets; bids being taken.

SAN FRANCISCO, 167 tons, apartment building, Larkin Street between Greenwich and Lombard Streets.

LOS ANGELES, 620 tons, two 80,000-bbl. tanks for George P. Getty; bids being taken.

CLEVELAND, 200 tons, parish house for St. Paul's Episcopal Church.

CLEVELAND, 200 tons, warehouse for Ohio Bell Telephone Co.

ROCHESTER, N. Y., 1900 tons, subways; J. M. Luddington Son's Co., low bidder.

CENTRAL RAILROAD OF NEW JERSEY, 200 tons, bridge at Elm, N. J.

PHILADELPHIA, 300 tons, apartment and stores on Chelten Avenue.

Railroad Equipment

The Western Maryland has ordered steel car parts from several car builders and will build in its own shops 1000 hopper cars of 55 tons capacity.

The New York Central is inviting bids on 30 4-6-4 and 30 4-6-2 type locomotives and 6 8-wheel switching engines.

The Pacific Fruit Express is said to have placed 600 underframes with the Pacific Car & Foundry Co.

The Union Tank Car Co. has ordered 300 tank cars from the American Car & Foundry Co. and 200 from the General American Tank Car Corporation.

The Southern Railway has ordered 10 30-yd. and 10 20-yd. air dump cars from the Koppel Industrial Car & Equipment Co.

The Boston & Maine has bought 6 air-dump cars from the Magor Car Corporation.

The Consolidated Coal Co. has ordered 600 mine cars from the Bethlehem Steel Co.

The Southern Pacific has bought 500 sets of steel underframes and superstructures for cars from the Greenville Steel Car Co.

The Duluth, Missabe & Northern is in the market for 250 ore cars.

The Rock Island is in the market for 100 underframes for ice cars.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Apr. 19	Apr. 18	Apr. 16	Apr. 14	Apr. 13
Lake copper, New York	13.12½	13.12½	13.12½	13.12½	13.12½
Electrolytic copper, N. Y.*	12.87½	12.75	12.75	12.75	12.75
Straits tin, spot, New York	68.62½	68.50	....	68.12½	68.00
Lead, New York	7.15	7.15	7.20	7.20	7.25
Lead, St. Louis	6.90	6.92½	6.92½	6.95	7.00
Zinc, New York	6.72½	6.72½	6.72½	6.72½	6.75
Zinc, St. Louis	6.37½	6.37½	6.37½	6.37½	6.40

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, April 19.—The Easter season, particularly the holidays in London and some European countries, has interfered with the usual course of the metal market. Prices here are almost daily affected by quotations from the other side. The London market was closed from Thursday night until this morning. In general copper is a little firmer with demand somewhat better. The tin market has been moderately active with prices a little higher. Quotations for lead have been reduced and those for zinc are a little lower, with buying of both metals quite light.

Copper.—The March statistics, which appeared last Wednesday, April 13, were distinctly favorable to sellers. They showed a decline in refined stocks of about 2400 tons from those at the end of February, and also a marked reduction, amounting to about 12,000 tons; in blister copper. Output at the mines also showed a decline of about 6 per cent from previous months. The effect of these announcements was not pronounced though there was quite a little buying by both foreign and domestic consumers, particularly foreign, just following the news. Since then, there being a virtual holiday on Good Friday, there has been very little business from either source. Now there is a little more inquiry and prices have tended to stiffen, both yesterday and today, Tuesday. Electrolytic copper today is quoted by practically all producers at 13.12½c., delivered in the Connecticut Valley, although up to and including yesterday, some metal was available at 13c. Consumers are well covered for April, but some of them must buy some metal for May with June requirements for nearly all users still to be contracted for. There is, however, no rush to buy, but the expectation of a stronger market in the near future is quite general. There has been no change in the official quotation of Copper Exporters, Inc., which is 13.35c., c.i.f. Hamburg. Lake copper is quoted at 13.12½c. to 13.25c., delivered.

Tin.—The market has been quiet on the surface, but sales for the week ended Saturday aggregated between 900 and 1000 tons, despite the holiday on Friday. As in the previous week, dealers did the bulk of the business, consumers buying very little. Prices have gradually advanced and the undertone of the market in general is firm. This is due largely to the unwillingness of sellers who are not inclined to make concessions. Those desiring to make purchases have had to pay what is asked. Saturday very little business was done and yesterday, Monday, about 100 tons changed hands. Today the market has been very quiet with spot Straits tin quoted at 68.62½c., New York. Prices in London today, the first since last Thursday, were about £3 per ton higher than a week ago, with spot standard quoted at £306, future standard at £299 10s. and spot Straits at £319. The Singapore price today was £306. Arrivals thus far this month have been 4535 tons, with 5050 tons reported afloat.

Lead.—Indications of weakness developed the middle of last week when lead was offered at an equivalent of 7.20c., New York, in the outside market. This tendency became more pronounced and yesterday, Monday, the American Smelting & Refining Co. reduced its New York contract price from 7.25c. to 7.15c. Today in the outside market the metal is quoted at 6.90c. to 6.92½c., St. Louis. The market is generally quiet with buying confined mostly to small lots.

Zinc.—The unfavorable effect of the March statistics, issued and reported in this paragraph last week,

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	70.00c. to 71.00c.
Tin, bar	72.00c. to 73.00c.
Copper, Lake	14.50c.
Copper, electrolytic	14.25c.
Copper, casting	13.75c.
Zinc, slab	7.50c. to 8.00c.
Lead, American pig	8.25c. to 8.75c.
Lead, bar	10.80c. to 11.30c.
Antimony, Asiatic	16.50c. to 17.00c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	29.00c. to 30.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	42.00c. to 43.00c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	74.25c.
Tin, bar	76.25c.
Copper, Lake	14.00c.
Copper, electrolytic	14.00c.
Copper, casting	13.25c.
Zinc, slab	8.25c.
Lead, American pig	8.00c.
Antimony, Asiatic	19.50c.
Lead, bar	10.00c.
Babbitt metal, medium grade	23.75c.
Babbitt metal, high grade	76.25c.
Solder, ½ and ½	43.25c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.12½c. to 18.87½c.
Copper, hot rolled	21.75c. to 22.75c.
Copper, cold rolled, 14 oz. and heavier,	24.00c. to 25.00c.
Seamless Tubes—	
Brass	23.00c. to 24.00c.
Copper	23.75c. to 24.75c.
Brazed Brass Tubes	25.87½c. to 26.87½c.
Brass Rods	15.87½c. to 16.87½c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	12.00c. to 12.25c.
Zinc sheets, open	13.00c. to 13.25c.

Non-Ferrous Rolled Products

Mill prices on zinc sheets were reduced ¾c. on April 15 and are now quoted at 10.25c. Lead full sheets and bronze, brass and copper products have not changed since the reductions of April 1 and 8 respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.12½c.
Copper, hot rolled	21.75c.
Zinc	10.25c.
Lead (full sheets)	11.00c. to 11.25c.
Seamless Tubes—	
High brass	23.00c.
Copper	23.75c.
Rods—	
High brass	15.87½c.
Naval brass	18.62½c.
Wire—	
Copper	15.00c.
High brass	18.62½c.
Copper in Rolls	20.62½c.
Brazed Brass Tubing	26.12½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	35.50c.
Tubes, base	45.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	18.12½c.
Copper, hot rolled	21.75c.
Copper, cold rolled, 14 oz. and heavier	24.00c.
Zinc	12.00c.
Lead, wide	10.25c.
Seamless Tubes—	
Brass	23.00c.
Copper	23.75c.
Brazed Brass Tubes	26.12½c.
Brass Rods	15.87½c.

has not worn off and prices have tended to soften. Demand has been very light and reports are somewhat conflicting as to the levels at which business has been done. It develops that in the last few days prime Western zinc has been both offered and sold at 6.35c. to 6.40c., St. Louis, with some sellers attempting to hold the market at 6.40c. Ore prices are unchanged at $42 per ton, Joplin.

Antimony.—The chaos in China is forcing the antimony market higher. Fairly large stocks in this country is the only condition holding the market in check. Chinese metal for spot delivery is quoted at 15.50c., New York, duty paid, with futures held at 15.75c. per lb.

Nickel.—Ingot nickel in wholesale lots is quoted unchanged at 35c., with shot nickel at 36c., and electrolytic nickel at 39c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 26c. per lb., delivered.

Non-Ferrous Metals at Chicago

APRIL 19.—Several sizable orders for copper have been placed but at a concession in price. Stocks of antimony are lower and shipments from China are small. The old metal market is dull and prices are weak.

We quote in carload lots: Lake copper, 13.25c.; tin, 70c.; lead, 7.15c.; zinc, 6.50c.; in less than carload lots, antimony 16.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 7.25c.; lead pipe, 6c.; zinc, 4c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 15c.; all being dealers' prices for less than carload lots.

REINFORCING STEEL

Awards Amount to 4500 Tons and Inquiries Total Close to 7000 Tons

Including 2000 tons for municipal sewer work in Philadelphia and 1000 tons for a warehouse in Cleveland, inquiries for concrete reinforcing bars make a somewhat better showing this week, the total being nearly 7000 tons. Other projects pending are all under 500 tons. A number of small jobs make a total of 4500 tons in awards, details of which follow:

BOSTON, 200 tons, garage at 434 Newbury Street, to Kalman Steel Co.

ROCKFORD, ILL., 325 tons, Talcott Building, to Kalman Steel Co.

CHICAGO, 200 tons, garage at 1324 North Clark Street, to Concrete Steel Co.

CHICAGO, 700 tons of rail steel, apartment building at Melrose Avenue and Sheridan Road, to Barton Spider-Web System.

CHICAGO, 500 tons of rail steel, apartment building at Seventieth Street and South Shore Boulevard, to Barton Spider-Web System.

SHEBOYGAN, WIS., 250 tons, bridges, to Concrete Steel Co.

KENOSHA, WIS., 225 tons, Kenosha National Bank Building, to American System of Reinforcing.

OAKLAND, CAL., 100 tons, Fruitvale Medical Building, to Badt-Falk & Co., San Francisco.

OAKLAND, 210 tons, Lakeview Junior High School, Harrison Boulevard, to W. S. Wetenhall Co., San Francisco.

SAN FRANCISCO, 200 tons, Portola Junior High School, to an unnamed San Francisco jobber.

PHILADELPHIA, 160 tons, municipal incinerator plant, to McClintic-Marshall Co.

Old Metals, Per Pound, New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.50c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.25c.	10.75c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	8.50c.	10.125c.
No. 1 yellow brass turnings	7.75c.	8.50c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	6.00c.	6.50c.
Lead, tea	4.50c.	5.00c.
Zinc	4.00c.	4.50c.
Sheet aluminum	15.00c.	17.00c.
Cast aluminum	15.00c.	17.00c.

PHILADELPHIA, 215 tons, Pratt and Mulberry school, to Concrete Steel Co.

KEARNY, N. J., 140 tons, factory building for Gibson Lacquer Co., to Igoe Brothers.

CHICAGO, 200 tons of rail steel, Johnson Garage, to Truscon Steel Co.

CHICAGO, 500 tons of rail steel, Aldine-Sheridan apartments, to Barton Spiderweb System.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 150 tons, Y. W. C. A. building.

NEW YORK, 300 tons, Lee Warehouse; general contract not let.

LONG ISLAND CITY, N. Y., 275 tons, factory for Bayonne Steel Ceiling Co.; general contract not let.

WYOMING, OHIO, 100 tons, school, to Pollak Steel Co.

GARY, IND., tonnage being estimated, bank building; Ivar Viehe-Maess, architects.

CHICAGO, 475 tons, garage on Jackson Boulevard; R. C. Wieboldt & Co., general contractors.

CHICAGO, tonnage not stated, building for the Western Electric Co.; Turner Construction Co., general contractor.

CHICAGO, tonnage being estimated, Midland Bank Building; A. Ebstein, architect.

CHICAGO, 150 tons, factory building for Halsey Brothers; C. W. Lante, architect.

CHICAGO, 200 tons, Grant warehouse, Corner of Lawrence and Hermitage Avenues; Frederick Staunton, architect.

CHICAGO, 120 tons, apartment building at 5427 Kenwood Avenue; Lieschenke & Essen, architects.

DECATUR, ILL., 550 tons, Seventh Street viaduct.

SACRAMENTO, CAL., 256 tons, reinforcing steel for the State Highway Commission for work in Alameda County; bids May 2.

RIVERSIDE, CAL., 100 tons, bridge, plans being prepared; bonds not yet voted.

SAN FRANCISCO, 150 tons, building for the Ideal Realty Co., Second and Howard Streets; E. K. Nelson, general contractor.

CLEVELAND, 1000 tons, warehouse for the May Co.

CLEVELAND, 300 tons, warehouse for Ohio Bell Telephone Co.

PHILADELPHIA, 150 tons, Villa Maria Convent.

PHILADELPHIA, 2000 tons, municipal sewer work.

ALLENTOWN, PA., 500 tons, filtration plant.

ALLENTOWN, 300 tons, warehouse for Hess Brothers.

Less Trackwork Produced

Shipments of trackwork covering rails of 60 lb. per yard and heavier are reported for the first quarter of 1927 to have amounted to 40,128 net tons. The figures are from the American Iron and Steel Institute. They are not strictly comparable with preceding figures, for reports of one company have been withheld since the end of the first quarter of 1926. With that reservation the recent quarters have shown the tonnages given in the table.

Production has been less since 1923 than in that year, when 211,662 tons was shipped. In 1924 the total was 153,376 tons. In 1925 it was 171,394 tons and in 1926, with one company missing for the last nine months, it was 178,588 tons.

Net Tons	1927	1926	1925
First quarter	40,128	51,161	43,453
Second quarter	....	49,143	51,283
Third quarter	....	40,165	38,213
Fourth quarter	....	38,119	38,445
Year	....	178,588	171,394

CONTENTS

April 21, 1927

In This Issue

Should interest on investment be included in cost estimates? Yes, says consultant. **Management's use of stockholders'** money is a business expense and should be regarded as a cost factor.—Page 1134.

Finds grain size bears no relation to hardenability of steel. Resistance to hardening is caused by an excessive amount of oxygen in the steel, metallurgist declares.—Page 1144.

Take duty off manganese and preserve meager domestic reserves for emergency. A tariff of nearly 8 million dollars was collected in 1926 to "protect" an industry whose total output was valued at less than one-tenth that amount.—Page 1148.

Manufacturers not obliged to show cost data, Supreme Court rules. Denies Federal Trade Commission's application to force iron and steel companies to divulge cost figures. Commission may now ask the Attorney-General to institute mandamus proceedings.—Page 1145.

Will commodity price decline duplicate previous post-war experiences? Prices fell for about 30 years after War of 1812 and Civil War. Falling prices, with accompanying small profits, may be attributable in part to usual post-war trend.—Page 1164.

"Abnormal steel" is caused by excessive oxygen. Highly oxygenated steel may have very large or quite small crystals. Absorbs 20 per cent less carbon during carburization than oxygen-free steel.—Page 1144.

Earnings of 146 leading companies in metal trades ranged from zero to 68.86 per cent of invested capital. Automotive group leads, with an average of 25.44 per cent. Averaging 7.18 per cent, steel group is lowest, with a single exception.—Page 1156.

Making drastic price cuts to run shop at maximum capacity is unwise. More profitable to figure on the break-even point at **minimum** output.—Page 1137.

Computes relation of Brinell to Rockwell hardness numbers. Bureau of Standards has prepared formulas establishing the relationship of the two methods.—Page 1162.

General Motors has less than one-third the capital investment of Steel Corporation, but earned one-third more in 1926. Eugene Grace says steel stockholders are not receiving an adequate return on their investment. Believes it is just as essential to maintain purchasing power of investors as of wage earners.—Page 1151.

High-silicon steel can be made satisfactorily in ordinary open-hearth furnaces. One per cent silicon structural steel, averaging 59,025 lb. elastic limit, compares favorably with Bosshardt furnace product.—Page 1146.

Costs usually mount when output exceeds rated capacity of plant. Crowding and carelessness accompany effort to force plant beyond its economical productive limit.—Page 1135.

Heat treatment previous to carburizing does not affect the character of carburized zone. Pre-existing structure is totally obliterated during carburization, which involves recrystallization of the entire mass of steel.—Page 1142.

In sintering, screens perform an important function. By "fluffing" the charge, they reduce the burning time about 20 per cent and cut tonnage losses.—Page 1138.

In cutting prices to keep the plant busy, what is the "neutral point" below which it is unprofitable to go? It is the point where a reduction in manufacturing and selling costs becomes imperative.—Page 1136.

"Undertone of steel markets will continue weak," Dr. Haney believes. "The statistical position is not one that justifies price advances."—Page 1160.

Achievement in Estimating Last Year's Production

READERS will recall we gave in the first issue of this year—the annual review and statistical number of Jan. 6—a survey of the distribution of various forms of steel to different leading channels of consumption and also an estimate of the production of the steel for the year just ended. In view of the fact that the figures supplied by the makers covered in the main the shipments, as distinguished from the production, of steel, it may be surmised that the estimates of output require some consideration of conditions in setting down the results.

It is with some satisfaction, therefore, that we find surprisingly close approximation with the findings of the American Iron and Steel Institute in the matter of rails. The institute's total for the production of rails in 1927 is 3,217,649 gross tons. Included are 97,124 tons rerolled from old steel rails. Thus the tonnage of rails made from new steel is 3,120,525 and compares with 3,129,000 tons estimated in our Jan. 6 issue, made up of 2,949,000 tons of heavy rails and 180,000 tons of light rails. So, THE IRON AGE estimate of 15 weeks ago was ¼ per cent too high!

PERSONAL

Blake C. Hooper has been appointed manager of railroad sales, Baker-Raulang Co., Cleveland, manufacturer of electric tractors, trucks and cranes. For several years he has been secretary-treasurer of the Minnesota Supply Co., St. Paul, Minn., which represents the Baker-Raulang Co. in that territory. He is a graduate mechanical engineer, having attended Armour Scientific Academy and Armour Institute of Technology, Chicago. He was formerly connected with the Railway Materials Co., Chicago, as superintendent of its Toledo, Ohio, plant, as mechanical engineer in its general offices at Chicago and later as plant superintendent. In 1912 he entered the railway supply field.

BLAKE C. HOOPER

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Col. H. C. Boyden, formerly dean of the college of engineering, Ohio Northern University, Ada, Ohio, has joined the staff of the Celite Products Co., Los Angeles, and will give a series of lectures throughout the United States and Canada. He was for some time international lecturer for the Portland Cement Association.

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Herbert F. Cooper has been appointed general agent in New York for the Judson Freight Forwarding Co. and will have offices at 82 Beaver Street.

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E. H. Sager, recently Chicago representative for the Ajax Flexible Coupling Co., Westfield, N. Y., has been added to the sales organization of the Foote Brothers Gear & Machine Co., Chicago, and will represent that company in Michigan.

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John E. Wetzel, Philadelphia district sales manager for the Superior Steel Corporation, Pittsburgh, has been appointed Eastern sales manager with supervision over the Philadelphia, New York and Hartford district offices. His headquarters will remain at 1136 Widener Building, Philadelphia.

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Fred T. McCracken has been appointed Cleveland district representative for the Superior Steel Corporation, Pittsburgh. The sales office will be conducted under the name of Fred T. McCracken, Inc., with offices at 308 Euclid Avenue Building. Mr. McCracken was formerly connected with the Corrigan, McKinney Steel Co., Cleveland.

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Charles W. Henderson, Jr., recently with A. C. Harvey & Co., Boston, and Clayton L. Henderson, his son, are now associated with the E. P. Sanderson Co., East Cambridge, Mass., heavy hardware jobber.

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John Haswell, president Dayton Malleable Iron Co., Dayton, Ohio, has been elected to the board of directors of the National Cash Register Co., Dayton.

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Horace W. Merriman, for many years with the Carnegie Steel Co. in Philadelphia, will on May 1 join the sales organization of the Donner Steel Co. in its Philadelphia office. He will succeed J. K. Baylis, who recently left the Donner organization to become structural and plate sales agent in Buffalo for the Bethlehem Steel Co.

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H. R. Condon, formerly associated with the Pennsylvania Railroad Co. at Pittsburgh, has been made general manager of the American Mond Nickel Co., and will have his headquarters in the Century Building, Pittsburgh.

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D. W. Widmayer, for six years assistant sales manager of the Asbestos Shingle, Slate & Sheathing Co., Ambler, Pa., has been appointed Western sales manager and manager of the company's new St. Louis factory.

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James E. Redman, associated for some years with the Biflex Co., Detroit, has been made assistant to the president of the American Bosch Magneto Corporation, Detroit, and will have as his duties the development of the company's jobbing business. Matthew J. Herold, formerly sales manager of the United States Electrical Tool Co., Cincinnati, has also been added to the Bosch organization and will act as special field representative, giving particular attention to the sale of shock absorbers.

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D. M. MacDowell has been placed in charge of the office recently opened at 613 Machinery Hall, 549 West Washington Street, Chicago, by the Chambersburg Engineering Co., Chambersburg, Pa.

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B. A. Shutts, for five years general manager of the New York Central Iron Works Co., Inc., Hagerstown, Md., has severed that connection.

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Ralph H. Smith, Buist Avenue and Berbro Street, West Philadelphia, has been appointed factory representative in the Philadelphia territory for the George Haiss Mfg. Co., Inc., New York.

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Joseph H. Hazley, sales manager the Jacobs Mfg. Co. and the Rhodes Mfg. Co., Hartford, Conn., is in San Francisco on a tour of the Far Western States in the interests of the companies he represents.

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J. E. Spurr, editor *Engineering and Mining Journal*, New York, since 1919, has resigned and on April 16 sailed for a six weeks' trip through northern Europe. Mr. Spurr has made no small contribution to technical literature and his editorial writing has shown a talent in journalism that has well matched his equipment as an engineer.

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Walter C. Allen, president Yale & Towne Mfg. Co., stricken with and operated on for appendicitis in Hamburg, Germany, last week, is reported to be improving.

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George P. Rhodes, vice-president Colonial Steel Co., Pittsburgh, has been elected president of the company to succeed the late Charles M. Brown. Mr. Rhodes has been a prominent figure in the iron and steel industry at Pittsburgh for the last 40 years, his first connection having been with the Pennsylvania Tube Works, now a part of the National Tube Co. Later he served as secretary-treasurer of the National Car Wheel Co., having held that position at the time of its absorption by the American Brake Shoe & Foundry Co. S. Clark Reed, vice-president Oil Well Supply Co., Pittsburgh, has been elected to the directorate of the Colonial company in Mr. Brown's place.

Advisory Transmission Engineers

Creation of a board of advisory engineers from among the leading industrial and operating engineers of the country is announced by the Power Transmission Association, 644 Drexel Building, Philadelphia. William Staniar, belting and transmission engineer of the duPont Co., Wilmington, Del., has been appointed chairman of this board. Prior to his association with the duPont Co., which began in 1905, Mr. Staniar had experience in blast furnace design and construction.

This action was taken at a meeting April 1 in the Old Colony Club, LaSalle Hotel, Chicago, at which a number of reports were presented and papers read. It is hoped that representative engineers connected with various industries using mechanical transmission appurtenances will be attracted to this board, so that the combined experience of a great number of experts may become available.

OBITUARY

CHRISTOPHER J. MORGAN, best remembered as general superintendent Pittsburgh Steel Co., but for the past year president Williams Welding Co., Charleroi, Pa., died at his home in Charleroi April 17. He was born in Pittsburgh in 1860 and for more than 40 years had been identified with the iron and steel industry. Before going in 1899 with the Pittsburgh Steel Hoop Co., Glassport, Pa., the predecessor of the Pittsburgh Steel Co., he had worked in the old Painter Mills, Pittsburgh, and was master mechanic of that works. He held the same position at Glassport until 1904, when he was appointed superintendent to succeed J. J. Rebman. When the company completed its plant at Monessen, Pa., in 1908, and became the Pittsburgh Steel Co., Mr. Morgan was appointed assistant superintendent and transferred to Monessen. Four years later he was appointed general superintendent and held that position until Feb. 1, 1925.

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LEON PHILIP FEUSTMAN, vice-president Worthington Pump & Machinery Corporation, New York, died in that city on April 7, aged 66 years. Following his graduation from the University of Pennsylvania he worked for a time at Leadville, Colo., and later was manager of the Mexican interest of the Consolidated Smelting & Refining Co. In 1903 he became associated with the Power & Mining Machinery Co., retaining that connection after the company's merger with the International Steam Pump Co., of which he became general manager. He remained with the company after its reorganization as the Worthington company, and had had been an active vice-president for a number of years.

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JAMES WILSON, president Wilson Stove & Mfg. Co., Metropolis, Ill., and designer of the down-draft wood stove known as the Wilson heater, died recently at the Missouri Baptist Sanitarium, St. Louis, after an illness of several months. He was born in 1844 at Ambroath, Scotland, and came to America in 1862. After working at the tinner's trade in New York and Brooklyn for several years, he went to Texas and engaged in the hardware business. In 1892 he designed and patented the Wilson heater, and in 1893 opened a stove plant at Seventh and Poplar Streets, St. Louis. In 1907 the plant was moved to Valley Park, Mo., and 10 years later to Metropolis.

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CHARLES G. GROSS, for 60 years connected with the A. M. Byers Co., Pittsburgh, and for the past two years, as assistant to the president, died at his home in Dormont, Pa., April 13. He was born in Constatt, Wurtemberg, Germany, 78 years ago, coming to Pittsburgh in 1867, when he became identified with the Byers company as a shipping clerk. He advanced steadily and in 1892 was made manager of the Pittsburgh works of the company, holding this position until 1925.

Shipments of electric industrial trucks and tractors in March are reported by the Department of Commerce to have numbered 116, compared with 138 in February and with 147 in March, 1926. Ten of the current units are for export, 10 are tractors for domestic use and 96 represent all other domestic types. For the first quarter of 1927 shipments were 310 domestic and 34 export, compared with 357 domestic and 17 export in the first quarter of 1926.

Production of bituminous coal in the week ended April 9 is estimated by the National Coal Association at 7,900,000 net tons. This was the first full week following the suspension of operations in union mines. Production during the week ended March 26 was given by the Bureau of Mines as 13,373,000 tons and during the week ended April 2 at 11,097,000 tons.

Foundrymen of Central New York to Hold Annual Meeting

The annual meeting of the Central New York State Foundrymen's Association is to be held Friday, April 22, at the Hotel Syracuse, Syracuse, N. Y. A business meeting has been arranged for 4 p. m., followed by a dinner at 6.30 p. m. In the evening, H. B. Hanley, chemist Whitehead Brothers, Rochester, N. Y., will give a practical demonstration of core and molding sand, assisted by Benjamin D. Fuller, chairman of the joint committee on molding sand research of the American Foundrymen's Association. Mr. Hanley will bring with him the necessary apparatus for practical demonstrations on sand samples taken from various molding floors in the Rochester-Syracuse territory, and he will also present a number of lantern slides. W. H. Barr, president National Founders' Association, will also be present. It is announced that he has a message of vital interest to foundrymen.

Foremen Training Conference

Under the auspices of the Division of Vocational and Extension Education, New York State Department of Education, a conference will be held at the Niagara Hotel, Niagara Falls, N. Y., Friday, April 22, which will be devoted to the development of foremen training work in the State. The sessions will be presided over by A. J. Herrin of the National Carbon Co., who is chairman of the industrial relations group of the Niagara Falls Chamber of Commerce.

At the morning session, following introductory remarks by H. C. Logan of the Union Carbide Co., Lewis A. Wilson, director of the Division of Vocational and Extension Education, Albany, and Arthur L. Mann, State Supervisor of Industrial Education, five papers will be read, as follows:

"Local Courses for Industrial Conference Directors," by Charles B. Williams, industrial secretary Y.M.C.A., Binghamton.

"The Foreman As An Investment," by W. K. Cooper, Salisbury Axle Co., Jamestown.

"Results of Foremen Conferences," by Elmer C. Schacht, Manning Abrasive Co., Troy.

"Some Difficulties Attending the Introduction of Foremen Conferences," by Raymond T. Starr, Columbian Rope Co., Auburn.

"Evening Courses in Foremanship," by William J. Small, deputy superintendent in charge of Vocational Education, Niagara Falls.

Four papers to be read and discussed in the afternoon include the following:

"Conference Method in Foremanship Development," by A. S. McArthur, educational director, Kimberly-Clark Co., Neenah, Wis.

"Getting Materials for a Continued Program of Conferences," by B. O. Snyder, educational director North East Electric Co., Rochester.

"Use of Conferences in Passing on Technical and Operating Data," by C. S. Thayer, superintendent Aluminum Co. of America, Niagara Falls.

"Further Development of the Conference Movement in Industry," by John D. Strain, secretary Industrial Association of Utica.

Scheduled discussions on these papers, in the order given above, will be presented by F. A. Robinson, service director Kimberly-Clark Co., Niagara Falls; C. V. Bush, director Industrial Education in the Public Schools, Jamestown; W. J. E. Smith, General Electric Co., Schenectady; Herbert W. Allen, M. Wile & Co., Buffalo; A. J. Herrin, National Carbon Co.; C. L. Peake, director industrial relations, American Radiator Co., Buffalo; W. E. Hughes, safety engineer, Rochester Gas & Electric Corporation; Bruce Irwin, Aluminum Co. of America, Niagara Falls, and E. R. Cole, superintendent Acheson Graphite Co., Niagara Falls. Following the discussion on the last paper there will be a general summary and discussion of the points brought out by the conference.

Production of the American Radiator Co. works in Springfield, Ill., recently acquired from Montgomery-Ward interests, and located in the Hummer Plow plant, will start April 15, W. H. Watt, general manager, has announced. Refrigerator castings and oil condensing sections will be manufactured.

FEWER PASSENGER CARS

Automobile Trucks Running Ahead of Last Year But Passenger Cars Are Far Behind

WASHINGTON, April 19.—March production of motor vehicles in the United States was 386,721, of which 341,665 were passenger cars and 45,056 were trucks, according to reports to the Department of Commerce. Production in February amounted to 298,750 vehicles, of which 260,632 were passenger cars and 38,118 were trucks. Production in March, 1926, totaled 422,728, of which 381,116 were passenger cars and 41,612 were trucks.

For the first quarter, production has been 799,270 passenger cars and 120,417 trucks, a total of 919,687 vehicles. This compares with 973,801 passenger cars last year, together with 103,970 trucks, a total of 1,077,771, or 17 per cent above this year. Trucks are running well ahead of last year, each month having shown a greater number than its counterpart a year ago. But passenger cars are far behind, no month having come within 39,000 of the figure for the corresponding month of last year. The quarter last year was 22 per cent higher than that for the three months just ended. Not since 1922 has a smaller first quarter been recorded, in passenger cars.

New Switching Charges on Steel in Chicago Effective April 30

WASHINGTON, April 19.—Rates of 3.5c and 4c. per 100 lb. for minimum carloads of 60,000 lb., on direct interchange and indirect interchange hauls respectively, will apply on iron and steel products within the Chicago switching district and from Chicago Heights to Chicago, effective April 30, unless tariffs calling for those rates are suspended by the Interstate Commerce Commission. So far no protest against these rates, which also apply to other commodities, has been made by steel interests, but protests have come from other lines of manufacture. The present rate is 2.5c. flat. The railroads had filed tariffs proposing much higher rates, which were protested by iron and steel and other interests. Hearings on the proposed rates had been arranged but by orders announced last Saturday the commission canceled the proceeding in view of the compromise rates now on file, which the railroads proposed after canceling the high rates which had been contemplated.

New Steel Distributer in Detroit

Lawrence W. Cross, district manager at Detroit for the Empire Steel Co., Cleveland, is president of the newly organized Continental Steel Corporation with offices at 604-5 Stephenson Building, Detroit, and warehouse at 5674 Twelfth Street. The new company will act as a jobber of sheets, strips, bars and other steel products. Mr. Cross will continue to represent the Empire company in the State of Michigan. Arthur L. Tushbant, president of the General Steel Corporation, Detroit, is secretary-treasurer of the new company.

Hanna Co. Acquires New Oven Properties

The M. A. Hanna Co., Cleveland, has organized the Missouri Ore Co. which has taken over and will operate the iron ore properties in Missouri that have heretofore been operated by the Iron Mining Co. The new company will conduct exploration work and in addition will continue the operation of a mill for treating conglomerate concentrates, a small tonnage of which is produced and shipped to the St. Louis Coke & Iron Corporation. The property acquired covers 16,000 acres. The Hanna company has also taken over under lease the Loretto Iron Mine at Loretto, Mich., on the Menominee Range which will be operated under the name of the American Boston Mining Co. The product of this mine is low manganese low phosphorus ore and its expected output is 12,000 tons per month. The new owners will make various improvements for the operation of the mine, including its electrification.

Steel Framework Not Injured in Recent New York Hotel Fire

The spectacular fire which broke out on the evening of April 12 in the scaffolding at the thirty-sixth floor of the partially completed Sherry-Netherlands Hotel, Fifth Avenue and Fifty-ninth Street, New York, resulted in little or no damage to the structural steel framework of the building. The steel, which was fabricated and erected by the Taylor-Fichter Steel Construction Co., New York, was covered with fireproofing material demanded by the city building code, and only a few shapes in the tower of the building were exposed to the flames. These pieces were warped slightly, but not to the extent that they could not be straightened on the job without replacement. An interesting result of the fire was a statement, credited to the city fire commissioner, in which he condemned the building code for allowing wooden scaffolding to be used in the erection of a modern steel frame building.

Orders for Steel Boilers

February orders for steel boilers, reported to the Department of Commerce by 68 manufacturers, numbered 1070, with 985,778 sq. ft. of heating surface. This is a sharp increase over the January total of 1000 boilers and 828,421 sq. ft. It is a decline, however, as compared with the average month of 1926. In the first half of that year the average was 1657 boilers and 1,679,000 sq. ft., while in the second half the average was 1420 boilers and 1,333,000 sq. ft.

Nearly all of the February orders covered stationary boilers. Marine boilers accounted for only 14 units of 26,825 sq. ft. Heating boilers, as differentiated from power boilers, numbered 514, or nearly half the total. That they were small, however, is shown by the heating surface of 245,936 sq. ft., or less than one-quarter the total.

Record Output of By-Product Coke

WASHINGTON, April 19.—Production of by-product coke in March totaled 3,879,000 tons, the largest monthly output ever recorded. It showed a gain of 444,000 tons, or 12.9 per cent, over February's total of 3,435,000 tons, according to the Bureau of Mines. The March production exceeded that of March, 1926, and 1925, by 2.4 per cent and 12.4 per cent, respectively. The daily rate was 125,117 tons, an increase of 2435 tons, or 2 per cent, over the February rate. There were 76 active plants and one idle, the same as in January and February. These plants produced about 87 per cent of their capacity.

Output of beehive coke also increased, the total for the month being estimated at 890,000 tons, a gain of 18 per cent over the February production of 754,000 tons. The daily rate of 32,972 tons shows a gain of almost 5 per cent. Output of all coke amounted to 4,769,000 tons, of which 81 per cent was contributed by by-product ovens.

Of the total production of by-product coke during March 3,220,000 tons, or 83 per cent, was made in plants associated with iron furnaces and 659,000 tons, or 17 per cent, was made at merchant or other plants.

Increase in Stoker Sales

Mechanical stokers sold in March are reported by the United States Department of Commerce to have been 115 units aggregating 49,694 hp. The returns are from 11 establishments. The total is the largest since that of last July. It compares with 41,400 hp. in February and with 52,312 hp. in March of last year. The average month of last year provided sales of about 45,500 hp., which was a little greater than the average month of 1925.

Chinese Importation Almost Normal

Silver Stocks in Shanghai Aid Credit But Interior Shipments Are Small—British Market Quiet—German Steel Workers Ask Increase

(By Cable)

LONDON, ENGLAND, April 19.

ALL markets are quiet following the Easter holidays. Pig iron consumers are discouraged by the high prices and are purchasing only immediate requirements. Operation is high with 178 furnaces in blast at the end of March. Foreign ore continues quiet.

Steel mills are as full as possible and shipyards particularly are pressing for deliveries. Development of new business, however, is hampered by high prices and extended shipments.

March exports of pig iron totaled 22,041 tons, of which the United States took 3000 tons. Total exports of iron and steel were 353,037 tons.

Tin plate is dull. Galvanized sheet demand from India is quiet, but other markets are moderately active on small lots. Black sheet demand is improving.

Continental markets are quiet, with prices tending toward lower levels.

CHINESE BUYING NORMAL

Silver Stocks at Shanghai an Aid But Shipments to Interior Delayed by War

(By Cable)

SHANGHAI, CHINA, April 14.

BUSINESS in steel products is almost normal despite the disturbed conditions. Tin plate activity is an outstanding feature of the market, with monthly sales approximating 20,000 boxes and current inquiries about 40,000 boxes.

Sales of plain galvanized sheets are averaging about 400 tons a month. Black sheet purchasing is running about 200 tons a month, with Japanese competition in the light gages increasing. March sales of Japanese sheets totaled about 150 tons. Few new inquiries are reported.

There have been a few small inquiries for black and galvanized pipe and a limited number of purchases. In wire, Shanghai stocks are generally depleted and shipments to the interior from Yangtze River ports are at a low level.

The Hankow market is completely demoralized with no inquiries or sales reported. In most instances, shipments to the Hankow district are being held at Shanghai by the sellers. Dealers are demanding drafts before making shipment and in a few cases banks are holding material due to non-payment.

Rail inquiries continue. From Manchuria, it is reported that 7200 tons of rails have been purchased by the Mukden-Hellung Railway.

Credit facilities in the Shanghai district are easier on steel commodities than in previous months, as there are silver stocks in Shanghai of about $160,000,000 shipped from interior ports for safety. This enables buyers to use this silver on deposit against credits.

Recently there has been a slight decline in the domestic market on galvanized sheets, tin plate and bars. Practically all business in bars and plates is being placed with European makers because of lower prices.

FRENCH PRICES DECLINE

German Competition Met and Lower Market is Developing—Quotations Widely Varying

PARIS, FRANCE, April 8.—There has been some improvement in market conditions since February, but business generally is still quiet and there is a tendency toward weakness in prices, particularly in the export field. During the brief revival in March, however, many mills were able to refill their order books, so that

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British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd.	£1	4s.					$5.82	
Bilbao Rubio ore†	1	2	to £1	2½s.			5.33	to $5.45
Cleveland No. 1 fdy.	4	2½					20.00*	
Cleveland No. 3 fdy.	4	0					19.40*	
Cleveland No. 4 fdy.	3	19					19.15*	
Cleveland No. 4 forge	3	18½					19.03*	
Cleveland basic	3	15	to	3	15½		18.18	to 18.30
East Coast mixed	4	5	to	4	6		20.61	to 20.85
East Coast hematite	4	7½	to	4	8½		21.22	to 21.45
Rails, 60 lb. and up	7	15	to	8	5		37.58	to 40.01
Billets	7	5	to	7	10		35.16	to 36.37
Ferromanganese	15	0					72.75	
Ferromanganese (export)	15	0					72.75	
Sheet and tin plate bars, Welsh	6	5	to	6	10		30.31	to 31.52
Tin plate, base box	0	19½	to	1	0		4.72	to 4.85
Black sheets, Japanese specifications	14	5					69.11	
							C. per Lb.	
Ship plates	7	15	to	8	5		1.68	to 1.78
Boiler plates	11	0	to	11	10		2.38	to 2.49
Tees	8	10	to	9	0		1.84	to 1.95
Channels	7	15	to	8	5		1.68	to 1.78
Beams	7	10	to	8	0		1.62	to 1.73
Round bars, ¾ to 3 in.	8	5	to	8	15		1.78	to 1.89
Steel hoops	10	10	to	11	0		2.28	to 2.39
Black sheets, 24 gage	11	5					2.44	
Galv. sheets, 24 gage	15	5	to	15	7½		3.30	to 3.33
Cold rolled steel strip, 20 gage, nom.	14	0					3.03	

*Export price, 6d. (12c.) per ton higher.
†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	9½s.	to £3	10s.			$16.85	to $16.97
France	3	9½	to 3	10			16.85	to 16.97
Luxemburg	3	9½	to 3	10			16.85	to 16.97
Basic pig iron:								
Belgium	3	5	to	3	15		15.76	to 18.18
France	3	5	to	3	15		15.76	to 18.18
Luxemburg	3	5	to	3	15		15.76	to 18.18
Coke	0	18					4.37	
Billets:								
Belgium	4	9	to	4	10		21.58	to 21.82
France	4	9	to	4	10		21.58	to 21.82
							C. per Lb.	
Merchant bars:								
Belgium	4	17½					1.08	
Luxemburg	4	17½					1.08	
France	4	17½					1.08	
Joists (beams):								
Belgium	4	18½					1.09	
Luxemburg	4	18½					1.09	
France	4	18½					1.09	
Angles:								
Belgium	4	19					1.09	
¼-in. plates:								
Belgium (nominal)	6	8					1.40	
Germany (nominal)	6	8					1.40	
⅞-in. ship plates:								
Belgium	6	1					1.33	
Luxemburg	6	1					1.33	
Sheets, heavy:								
Belgium	6	3	to	6	4		1.35	to 1.36
Germany	6	3	to	6	4		1.35	to 1.36

(a) Nominal.

a number are in a position to maintain their prices. Fuel prices have declined further, but the pig iron and steel markets are not expected to reflect this downward revision, as both markets are at too low a level.

Export business is quiet, with Germans unexpectly showing an increase in activity that is making the maintenance of foreign prices difficult and preventing many French mills from refilling their order books for the coming summer period of quiet. February exports, however, were fairly satisfactory with 151,656 metric tons of pig iron compared with 133,374 tons in February, 1926, and 725,746 metric tons of steel compared with 519,792 tons in February last year. Imports of pig iron declined from 4901 tons in February, 1926, to 3689 tons, and steel imports advanced from 13,718 in February of last year to 14,485 tons in February of this year.

Pig Iron.—Producers of phosphoric foundry iron have agreed to place 25,000 tons of foundry at the disposal of domestic consumers for May. April prices are to be maintained, the recent decline in the price of French coke having been discounted some time ago by a reduction in the pig iron price. Demand for hematite iron has improved and blast furnaces are understood to have found it necessary to place an additional 5000 tons at the disposal of foundrymen in April, bringing the total to 30,000 tons, which will probably be the tonnage available for May delivery. A meeting of French, Belgian and Luxemburg producers of phosphoric foundry iron was held in Paris, April 7, for the purpose of forming a stronger export comptoir. No decision was reached but discussions will continue on the question of establishing export quotas for each participant. For the present the entente decided to maintain its export prices at the present level. Payment of an export premium was also considered, but there is evidently considerable difference of opinion as to how such a premium should be applied.

Semi-Finished Material.—The domestic market is quiet, but in export trade the tendency of the market is downward. This is attributed to two factors; delay in beginning negotiations for the formation of an international selling cartel and the revival of German competition. Blooms are quiet and range from £4 3s to £4 7s ($20.12 to $21.10) per metric ton, f. o. b. Antwerp. Billets are not particularly strong and as low as £4 9s. 6d. to £4 12s. per ton ($21.70 to $22.30) has been quoted. On sheet bars, German sellers are reported to have quoted as low at £4 14s. to £4 15s. ($22.78 to $23.03) per ton, f. o. b. Antwerp, and this price has undoubtedly been met by French and Belgian exporters.

Finished Material.—Quotations on beams vary considerably, some French mills being willing to accept £4 15s. to £4 18s. 6d., per ton (1.05c. to 1.09c. per lb.), f. o. b. Antwerp, depending upon the tonnage and specifications. Belgian mills are quoting £4 16s. to £4 19s. (1.06c. to 1.09c. per lb.), f. o. b. Antwerp. On bars, French and German sellers have recently quoted £4 17s. 6d. to £4 18s. 6d. (1.08c. to 1.09c. per lb.), but as low as £4 16s. to £4 17s. per ton (1.06c. to 1.07c. per lb.) is believed to have been done on actual business. Wire rods are quoted at £5 4s. to £5 6s. ($25.22 to $25.70) per metric ton, f. o. b. Antwerp.

Britain, Sweden and Germany Lead in Per Capita Use of Steel

HAMBURG, GERMANY, April 4.—Recent estimates of the annual per capita consumption of steel in European countries show a wide difference. The maritime nations lead with the largest use. Britain ranks first with an estimated use of 420 lb. per capita. Sweden is second with 411 lb. per capita and Germany third with 370 lb. per capita. Other consuming nations, in order of their importance as steel users, are: Belgium, 362 lb. per capita, Holland 311 lb., France 295 lb., Denmark 242 lb., Norway 211 lb., Austria 199 lb., Czechoslovakia 170 lb., Switzerland 165 lb., Hungary 160 lb., Italy 148 lb., Spain 116 lb., Portugal 88 lb., Bulgaria 82 lb., and Poland only 34 lb. The per capita consumption of rolled steel in the United States is estimated at about 620 lb.

FOREIGN RAILROADS BUY

Rolling Stock Taken by Germany, Egypt and South Africa—British Bids High

HAMBURG, GERMANY, April 4.—German railroad equipment manufacturers and car and locomotive builders report a satisfactory volume of business recently. The German railroads have again placed large orders, including 19,000 tons of bolts and a large quantity of fish plates. Various German locomotive builders will shortly receive parts of a total purchase of 117 locomotives to be purchased by the German railroads.

Recently German locomotive works have booked large orders from South Africa for locomotive accessories to the total value of about £300,000 ($1,455,000). Companies participating in this business include the Vulkanwerke Stettin, Friedrich Krupp A. G., the Stahlwerk Hoesch and the Bochumer Verein. A smaller order was also placed by the South African railroads with the Skodawerke at Pilsen, Czechoslovakia and the American Steel Casting Co., is reported to have received some of this business. British offers on this business are understood to have been, in most cases, about 20 per cent high.

British manufacturers, however, have booked some desirable business in railroad rolling stock. The greater part of the order of the Egyptian railroads went to British bidders, although their bids are reported to have been higher. The Metropolitan Carriage, Wagon & Finance Co., Birmingham, England, the Ringhoffer company in Germany and Baume et Marpent in Belgium and an unnamed British company, each received 250 freight cars on the order of the Egyptian railroads. Various British builders received 21 locomotives, 20 first class passenger cars were placed with the Carriage et Waggon Cie. in Belgium and 20 passenger cars each were booked by the Leeds Forge Co., Leeds, England, and Ringhoffer company in Germany. The French association of car builders also received 20 passenger cars.

The large order of the South African Government totaling about £500,000 ($2,425,000) worth of machinery, including dredges, cranes and electric equipment, was placed entirely in Germany. Belgian bids were lower, but were refused, it is claimed, because of the recent rejection by South Africa of about 30,000 tons of rails purchased in Belgium, which are to be sold as scrap.

German Workers in Steel Mills and Blast Furnaces Demand Increases

HAMBURG, GERMANY, April 4.—A growing demand for increase of wages is developing in the German steel industry. In February, about 160,000 metal workers in Saxony were on strike and partly successful in obtaining their demands. At present, the workers at the seaboard blast furnaces in Bremen, Lubeck and Stettin, a total of 12 furnaces, are demanding a 15 per cent wage increase, having refused to accept the 9 per cent advance decided upon by the Government commissioners and agreed to by the employers. Further negotiations will be entered into this month, which if unsuccessful will probably result in a strike.

Tool makers and workers in wire, bolt, rivet and screw works are demanding a 12 per cent increase in wages, which has been refused by the employers. Coal miners are dissatisfied with the recent increase in wages, blast furnace operatives in Upper Silesia and the Ruhr are demanding an 11 per cent wage advance, steel workers want a 10 per cent increase and workers in heavy hardware demand 15 per cent advance. There is also disagreement between employers and employees as to overtime.

Every effort is being made to avoid strikes, but it is considered quite possible that during the present month and May, strikes and lockouts may develop on a large scale, although it is not believed that such strikes would be of long duration. The financial position of the trade unions is weak at present and it is believed that an understanding will be reached in most cases.

MORE SHEETS SHIPPED

Production and Sales of Independent Manufacturers Well Ahead of Recent Months

SHIPMENTS of sheets by independent manufacturers in March showed an increase of 77,024 tons, the monthly report of the National Association of Sheet and Tin Plate Manufacturers discloses, but an increase of 77,169 tons in production indicates that mill operations were stepped in keeping with the increased demand. In point of obligations, the mills reporting were not so well off at the end of March than a month before. Unfilled orders as of March 31 were 510,924 tons, a decrease of 2078 tons from the end of February.

This is not easily understood nor explained, in view of the fact that sales for the month, which amounted to 345,900 tons, as indicated in THE IRON AGE of April 14, were 7464 tons in excess of shipments. In the ordinary method of computing unfilled orders, the difference between sales and shipments should register in the unfilled obligations. Production exceeded shipments last month by almost 21,000 tons, but the total of unshipped orders and unsold stocks is 160,357 tons, as compared with 157,614 tons at the end of February, an increase of only 2743 tons. The question naturally suggests itself: What disposition was made of the other 18,000 tons?

There has been no variation for months in the percentage of the capacity that is represented in the mills reporting, and apparently the same mills have been reporting each month. The value of the figures is impaired by the fact that comparison between the report of one month, and that of the month before, that will tie up and check is not possible. A change in the method of collecting the figures seems to be necessary.

Release of the figures for March makes possible a comparison of the first quarter of this year with the same period last year. Based on the monthly reports, the sales for the first quarter of this year were 849,208 tons, an increase of 110,551 tons over the same period in 1926. Meanwhile production, at 898,367 tons, represents a decrease of 48,961 tons, and shipments of 838,867 tons in the first quarter of this year were 105,767 tons less than in 1926.

Sheet Mill Operations of Independent Manufacturers

	1927			1926
	March	February	January	March
Total No. of mills	712	712	712	712
Capacity per month	452,310	397,500	422,400	415,315
Percentage reporting	73.5	73.5	73.5	74.9
Sales	345,900	241,951	261,357	304,233
Production	359,340	282,171	256,856	319,132
Shipments	338,436	261,412	239,019	320,623
Unfilled orders	510,924	513,002	526,550	534,641
Unshipped orders	113,530	110,446	116,687	111,948
Unsold stocks	46,827	47,168	44,974	61,433
Percentages of Capacity				
Sales	104.7	83.5	84.9	89.8
Production	108.8	97.4	83.5	94.2
Shipments	102.5	90.3	77.7	94.7
Unfilled orders	154.7	177.2	171.1	157.9
Unshipped orders	35.4	38.1	37.9	33.1
Unsold stocks	14.6	16.3	14.6	18.1

American Importers of Steel Quote Low Prices—Japanese Market Quiet

NEW YORK, April 19.—Prices of Continental steel, c. i. f. Atlantic port, are reported by importers to be lower than for some time, although the situation in Europe is fairly firm. A number of importers in the United States evidently placed sizable tonnages with European mills when the market was low and are now specifying against these contracts. Most of the current purchasing by American consumers, however, is confined to small lots of 100 tons or less.

Trade with Japan is smaller than for some time, a condition attributed in some quarters to the financial difficulties of Suzuki & Co., which recently became public. Quotations of American mills on tin plate are reported to be low and recent orders are understood to have been placed at low prices. Among purchases reported by Japanese exporters in the United States are about 600 tons of tie plates for 100-lb. rails, awarded to a large Japanese exporter in New York by the Imperial Government Railways.

FLUORSPAR SHIPMENTS

Production in United States Supplemented by Imports of Heavy Tonnages

WASHINGTON, April 19.—Making a record for all time, imports of fluorspar into the United States during the calendar year 1926 totaled 75,615 net tons, against 48,770 tons in 1925 and 50,821 tons, the previous highest total, in 1924. The lowest incoming movement in the seven year period 1920-1926 was in 1921, with 6229 tons. England in each year was the greatest source of fluorspar imports, but Germany made a rapid gain in 1926, when that country supplied 20,464 tons. During 1923 and 1924 British South Africa was the source of substantial imports, supplying 10,381 tons and 11,125 tons, respectively.

Exports from the United States are relatively negligible, the greatest total in the six-year period 1920-1925, being in 1920, with 2764 tons, with no record for 1926. Domestic production, which is used as equivalent to shipments from mines by some authorities, was also the highest in 1920, with a total of 196,609 tons.

The Tariff Commission has an inquiry under way based on an application of domestic producers of fluorspar to increase the duty under the flexible provision and it is probable that the report of the field work will be considered soon by the commission. The present duty is $5.60 per gross ton, equivalent to $5 per net ton.

Imports of Fluorspar into the Untied States by Principal Countries of Shipment

(Net Tons)

Calendar Year	England	Germany	British South Africa	Total, Including All Other Countries
1920	17,096	407	30	24,612
1921	1,644	215	....	6,229
1922	23,836	5,804	486	33,108
1923	23,300	7,988	10,381	41,884
1924	30,449	6,823	11,125	50,821
1925	21,633	11 854	7,908	48,770
1926	29,408	20,464	8,498	75,615

Domestic Production and Consumption of Fluorspar

(Net Tons)

	Production	Imports	Exports	Apparent Consumption
1920	196,609	24,612	2,764	218,457
1921	38,436	6,229	none	44,665
1922	129,653	33,108	2,296	160,465
1923	135,861	41,884	1,144	176,601
1924	146,549	50,821	617	196,753
1925	108,389	48,770	1,055	156,104
1926	128,657	75,615	....	204,272

Russia to Spend $119,000,000 for Metal Industries

The Amtorg Trading Corporation, 165 Broadway, New York, buying agent for the Soviet Union, announces that $119,000,000 has been allotted to the metal industries of that country for new construction and repair during the current fiscal year. The ferrous metal industry will receive $49,300,000; ore mining, $9,800,000; non-ferrous metal industry, $11,200,000; general machine construction, $20,400,000; shipbuilding, $2,000,000; metal wares, $5,100,000; agricultural machinery construction, $3,700,000; the remaining $17,500,000 to be used for the construction of various metallurgical plants.

Cuban Consuls Accept Invoices Mailed for Certification

WASHINGTON, April 19.—In accordance with a change in Cuban consular regulations, Cuban consuls are now directed to accept invoices sent them for certification by mail, says a cablegram received by the Department of Commerce from Frederick Todd, commercial attaché, Havana. Consuls of Cuba were recently instructed by the Cuban Secretary of State not to accept invoices forwarded to them for this purpose by mail. Exporters desiring to take advantage of the provisions of the new order must, however, have their firm names and their authorized signatures registered with the Cuban consulate to which the invoices are sent.

Machinery Markets and News of the Works

LITTLE CHANGE IN BUSINESS

Machine Tool Orders and Inquiries About the Same as Last Month

Delaware, Lackawanna & Western Railroad and Brooklyn-Manhattan Transit Co. Each Buy Several Tools

MACHINE tool business, with respect to both orders and inquiries, shows little change from that of last month, which the report of the National Machine Tool Builders' Association indicates was better than either January or February. Net orders for March, according to this report, averaged 149.2 as compared with 120.5 in January and 140.8 in February, the figure 100 representing the average for 1922-24. As there were more business days in March than in February the association concludes, however, that the daily average showed a slight recession last month. It is predicted that for the next few months the underlying trend is likely to show some further recession.

The Brooklyn-Manhattan Transit Co., New York, bought a number of tools for repair work on a list issued nearly a year ago. The Delaware, Lackawanna & Western bought five or six tools of a list of about a dozen on which figures were submitted a few months ago.

The Chicago Board of Education is planning a new technical high school for which more than 100 machine tools will be required.

The Union Pacific and the Chicago, Milwaukee & St. Paul railroads have come into the market for a few tools each.

New York

NEW YORK, April 19.

MACHINE tool sales are showing no increase in volume and inquiry is light. April is making no better showing than March and perhaps in some particulars it may not be as good. The outstanding purchases of the week were made by the Brooklyn-Manhattan Transit Co. and the Delaware, Lackawanna & Western Railroad. The former bought a number of tools on an inquiry nearly a year old, these tools to be placed in a repair shop at Coney Island. The Lackawanna bought about a half dozen tools, part of a list issued a few months ago; among its purchases were two 5-ft. radial drills. Other sales of the week were the following: 5-ft. vertical boring and turning mill to a manufacturer at Scranton, Pa.; 18-in. lathe to a factory supply company in Boston; a die sinking machine to a Schenectady, N. Y., forging company; also a die sinker to a Plainfield, N. J., plant, and one to a Toledo, Ohio, company; a 16-in. lathe to a grinding machine builder at Worcester, Mass., and the same type machine to a construction company in that city; jig borers to two companies in Detroit; a vertical surface grinder to a punch and shear manufacturer in Cleveland; a duplex centering machine to a Wayne, Ind., manufacturer; a 2-spindle drilling machine to a typewriter plant at Hartford, Conn., and a bench lathe and a bench miller to an automobile company at Pontiac, Mich.

Bids will be received by Charles M. Burdick, medical superintendent, Dannemora State Hospital, Dannemora, N. Y., until May 2 for an engine-generating set, 75-kw. capacity, with engine unit 120 hp., 110-volt, d.c. type.

The Rand-Kardex Bureau, Inc., North Tonawanda, N. Y., operated by Remington-Rand, Inc., 374 Broadway, New York, manufacturer of filing equipment, etc., has leased a four-story factory, 100 x 100 ft., at 260-68 Gold Street, Brooklyn, for a new branch plant.

S. J. Kessler, 529 Courtlandt Avenue, New York, architect, has plans for a one-story automobile service, repair and garage building at Park Avenue and 180th Street, to cost $200,000 with equipment.

The Central Structural Steel Co., Inc., Harlem River and 152nd Street, New York, has purchased property bounded by Allerton, Matthews and Bronxwood Avenues, and the Boston Post Road for $100,000 and is reported planning expansion at that location. N. Goldstone is head.

The B. F. Gilmour Co., Inc., 147 Forty-first Street, Brooklyn, is reported to be planning the installation of a pipe-threading and cutting machine and other tools at its pipe works.

The Queens County Motor Car Co., 169 Broadway, Flushing, L. I., has acquired property on the Northern Boulevard as a site for a new two-story service, repair and garage building, to cost in excess of $100,000 with equipment.

Pending the establishment of a proposed plant, the Cruz Collapsible Rim Corporation, 1560 Broadway, New York, José Cruz, president, is arranging to contract with a plant in the New York district for the manufacture of 500,000 of its patent collapsible automobile tire rims, and is taking bids for such production until May 15.

The United States Distributing Corporation, 17 Battery Place, New York, operating coal mines in the vicinity of Sheridan, Wyo., will make extensions and improvements in its properties, including the installation of machinery at the Hotchkiss mines.

The Board of Education, Ticonderoga, N. Y., plans the installation of manual training equipment in a proposed new high school to cost $300,000, for which plans will soon be prepared. W. W. Jeffers is president of the board.

Robert L. Schaap, Brooklyn, operating a welding and cylinder grinding works at 356 Cumberland Street, has leased the building at 1542 Atlantic Avenue for the establishment of a new plant.

Fire, April 8, damaged a portion of the plant of the Eastern Steel Bed Corporation, 516-26 Dumont Avenue, Brooklyn, manufacturer of metal bedsteads.

The Stern Electric Co., 29 Lispenard Street, New York, manufacturer of electric novelties, has leased space in the building at 96-98 Prince Street for a new plant and will remove to this location.

The Safety Cable Co., 114 Liberty Street, New York, manufacturer of electric wires and cables, etc., has concluded negotiations for the purchase of the plants and businesses of the American Insulated Wire & Cable Co., 954 West Twenty-first Street, and the Brenner-Moxley-Mervis Co., 3427 South Kedzie Avenue, both Chicago, and will consolidate with its organization. The first-noted purchased company specializes in the manufacture of insulated and bare copper wire, and magnet wire, and the last noted manufactures copper rods, wire, etc. It is understood that the Chicago plants will be continued in service. The Safety Cable Co. represents a merger several months ago of the Safety Insulated Wire & Cable Co., New York; the Phillips Wire Co., Pawtucket, R. I., and the A-A Wire Co., Harrison, N. J.

The Borough Council, South River, N. J., has approved plans for extensions and improvements in the municipal electric light and power plant, and waterworks, including

the installation of a 1250-hp. generating unit and auxiliary equipment, estimated to cost $175,000.

Mittag & Volger, Inc., Park Ridge, N. J., manufacturer of carbon papers and other processed paper stock, has plans for a two-story addition, to cost about $50,000 with equipment. Walter E. Truesdell, 29 Mountain Avenue, Summit, N. J., is architect.

The Public Service Electric & Gas Corporation, Public Service Terminal, Newark, N. J., is reported to have negotiations under way for the purchase of about 175 acres on Staten Island Sound, between Sewaren and Port Reading, N. J., as a site for a new steam-operated electric generating plant. The entire project is estimated to cost in excess of $2,000,000.

The Beller Electric Supply Co., 283 Market Street, Newark, N. J., has acquired a four-story factory, 185 x 252 ft., formerly occupied by Gould & Eberhardt, Inc. The new owner will remodel at a cost of about $125,000, and will use the larger part of the structure for a new plant.

The Oxweld Acetylene Co., 640 Frelinghuysen Avenue, Newark, manufacturer of acetylene welding equipment, etc., has asked bids on a general contract for a three-story addition, 72 x 200 ft., to cost close to $100,000 with machinery. Lockwood, Greene & Co., 100 East Forty-second Street, New York, are architects and engineers.

The Board of Education, Verona, N. J., is said to be planning the installation of manual training equipment in a proposed addition to the high school, reported to cost in excess of $150,000, for which bids are being asked on general contract until April 28. Sutton, Sutton & Calkins, 402 Broad Street, Newark, are architects.

The Seaboard Refractories Co., Woodbridge Avenue, Raritan Township, N. J., manufacturer of fire brick, refractory shapes, etc., contemplates rebuilding the portion of its plant destroyed by fire April 9, with loss reported at close to $175,000 including equipment. The power house was also destroyed. William E. Schultz is superintendent.

The American Gas Associates, formerly at 342 Madison Avenue, New York, are now located in the Graybar Building.

A. Johnson & Co., Inc., New York, exporter and importer, has removed its offices to 64 Water Street.

The Lalance & Grosjean Mfg. Co. has moved its general offices to its factory at Woodhaven, N. Y. After May 1 the company will maintain a sales office at 518 Pershing Square Building, New York.

The Central Foundry Co. and subsidiaries, including the Central Radiator Co., the Molby Boiler Co., Inc., the Essex Foundry, the Central Iron & Coal Co. and the Universal Pipe & Radiator Co., will be located on the twelfth floor of the new Graybar Building, Lexington Avenue, Forty-third and Forty-fourth Streets, New York, effective May 1.

The Chase Brass & Copper Co., Inc., is the name under which the Chase and Hungerford warehouse business is to be consolidated. The warehouse will be located at 80 Lafayette Street, New York, and all products will be sold through one organization.

Samuel Schneider has opened offices and a display room at 1225 Broadway, New York, under the name of the Harry Schneider Co. and will act as a manufacturers' representative for lighting fixtures, other electrical appliances and labor saving devices.

The Karle Thermometer & Instrument Co., Box 277, Passaic, N. J., has been organized to manufacture clinical thermometers.

Buffalo

BUFFALO, April 18.

ARRANGEMENTS have been completed by the Wire Wheel Corporation of America, Inc., 1700 Elmwood Avenue, Buffalo, for the purchase of the wire wheel division of the American Car & Foundry Motors Co., a subsidiary of the American Car & Foundry Co., 30 Church Street, New York, with plant at Detroit. The new owner will continue the Detroit works for the production of the Ash wire wheel for automobiles, invented by C. S. Ash, who will become identified with the purchasing company as consulting engineer, and will remove a portion of the equipment to the Buffalo plant, which will be the main works of the company. A new company of same name, Wire Wheel Corporation of America, Inc., has been chartered under New York laws, to take over and operate the enlarged organization. It is capitalized at 74,000 shares of stock, no par value. H. G. Jackson is president.

Fire, April 13, destroyed a portion of the mill of the International Paper Co., at Glen Park, near Parmelia, N. Y., with loss reported at $150,000 including equipment. Headquarters of the company are at 1 Pershing Square, New York.

The Rochester Gas & Electric Corporation, Rochester, N. Y., has plans for a new central steam power plant to cost $100,000 with equipment.

The Board of Education, Gowanda, N. Y., plans the installation of manual training equipment in a proposed new high school to cost about $250,000 for which it is expected to ask bids during the summer. Charles Jones is president of the board.

David R. Krieger, Batavia, N. Y., representing a company known as the American Planing Mill & Woodworking Co., has closed negotiations for the mill of the Broadbooks Co., Attica, N. Y., recently declared bankrupt, including wood-working business heretofore conducted by that company. The new owner is said to be planning to remodel the mill and will establish a branch at that location.

S. W. Adams, Oxford, N. Y., is at the head of a project to establish a local plant for the manufacture of wire fencing and kindred wire goods. It is purposed to purchase equipment at an early date.

The Newton Falls Paper Co., Newton Falls, N. Y., is said to have preliminary plans for a new hydroelectric power plant to cost in excess of $85,000.

Ogden R. Adams and Donald E. Dony have opened an office at 143 Cutler Street, Rochester, N. Y., and will deal in machine tools under the title of Adams & Dony.

New England

BOSTON, April 18.

SALES of new machines the past week were smaller than for the previous week, inquiries also falling off. Local dealers are of the opinion that some inquiries outstanding since early this year will not develop into orders, partly because of consolidations of plants and equipment and also on account of metal-working plants not securing anticipated business. During the first quarter of this year, machine tool manufacturers were among the most active inquirers for new equipment and made numerous purchases of single machines. Of late, however, they have hardly been a factor in the machinery market. A local dealer has sold a Massachusetts plant a dozen motor-driven pattern shop machines.

Used tools are more active than new, but recent sales consisted mostly of small tools and included a Blount grinder, a single-spindle Avey drill, Prentice Brothers drill, a small planer and similar equipment to Boston shops. One local dealer reports two fairly large transactions pending which give promise of closing.

The General Electric Co. is moving machinery and equipment from its Taunton plant to Lynn, Mass. Small motors were made at Taunton and about 400 were employed.

The Sweet Mfg. Co., Winsted, Conn., capitalized for $50,000 has been formed to manufacture enameled wire. It is expected to get into production by May 1.

The Bridgeman Machine Co., Hartford, Conn., automatic paper box manufacturing machines, will soon be established in the former plant of the New England Mills Corporation.

E. L. Huntsman, 58 Wendell Street, East Providence, R. I., contemplates the erection of a one-story artificial ice making plant at Barrington, R. I. Plans are private.

The Glenwood Rance Co., Taunton, Mass., has placed a contract with the Ferro Enamel Supply Co., Cleveland, for a complete porcelain enameling furnace equipped with a recuperator and charging forks.

The Hartford Electric Light Corporation, Hartford, Conn., is arranging for extensions and improvements for its steam-operated electric generating plant at South Meadow, including the installation of additional machinery. The company has authorized an increase in capital from $12,000,000 to $14,000,000, a considerable portion of the proceeds to be used for the expansion.

The Uppercu Cadillac Co., Bridgeport, Conn., has leased a new two-story building, 100 x 240 ft., to be erected at 1025 Fairfield Avenue, for a new service, repair and sales building, to cost in excess of $100,000 with equipment. Fletcher-Thompson, Inc., 542 Fairfield Avenue, is architect and engineer.

Following the recent purchase of the plant and business of the Strait Scale Co., Kansas City, Kan., E. & T. Fairbanks Co., St. Johnsbury, Vt., has begun the removal of the property to the last noted place, where production will be concentrated for the manufacture of track scales, in which the Strait company specialized. Plans are under way also for increased production in the line of beam scales.

The Worthington Pump & Machinery Corporation, Holyoke, Mass., has plans for extensions and improvements

The Crane Market

NEW inquiry is small and but little purchasing of either overhead or locomotive cranes is reported. The locomotive cranes and shovels for the Amtorg Trading Co., 165 Broadway, New York, have not yet been placed. Among recent inquiries for overhead cranes is a request for prices from Stone & Webster, Inc., Boston, on two 25-ton, 68-ft. span, 3-motor used overhead cranes.

Among recent purchases are:

Youngstown Ice Co., Youngstown, a 5-ton, 87-ft. span overhead crane from the Erie Steel Construction Co.

Consumers Power Co., Flint, Mich., a 5-ton bucket handling crane with ½-cu. yd. bucket, from the Shaw Electric Crane Co.

Green Fuel Economizer Co., Beacon, N. Y., two 5-ton electric traveling cranes from an unnamed builder.

at its local Deane pump works, including the construction of a one-story machine shop, 60 x 150 ft. The entire project will cost in excess of $150,000 with equipment. Headquarters are at 115 Broadway, New York.

The Draper Corporation, Hopedale, Mass., manufacturer of cotton mill machinery, has concluded arrangements for the purchase of the plants and business of the Hopedale Mfg. Co., manufacturer of kindred textile mill machinery, with plants at Hopedale, Milford, Mass., and Greenville, S. C., and will consolidate with its organization. The acquired plants will be continued in service and operations expanded at Hopedale. Clare H. Draper of the Hopedale company will become a member of the board of the Draper Corporation, and will be in charge of development and experimental work for the company.

The United States Radiator Corporation, 133 Grand River Avenue East, Detroit, and 136 Federal Street, Boston, has leased a building to be constructed at Cambridge, Mass., totaling about 20,000 sq. ft. of floor space, for a new factory branch and distributing plant. It is expected to be ready for occupancy in June and will cost more than $50,000.

The City Council, Nashua, N. H., has asked bids on a general contract for a one-story automobile service, repair and garage building, 60 x 200 ft., for municipal cars and trucks, to cost about $60,000 with equipment.

C. H. Dexter & Sons, Inc., Windsor Locks, Conn., operating a paper mill, has awarded a general contract to the R. G. Bent Co., Inc., Hartford, Conn., for a four-story addition, 80 x 100 ft., to cost in excess of $100,000 with equipment. Greenwood & Noerr, 847 Main Street, Hartford, are architects and engineers.

The G. R. Cummings Roofing Co., Meriden, Conn., metal and tin roofing, etc., has awarded a general contract to the H. Wales Lines Co., local, for a two-story addition to cost more than $35,000 with equipment.

The Hoosac Valley Lime Co., Howland Avenue, Springfield, Mass., has plans for extensions, including the erection of several buildings, new kilns and other equipment to develop more than four times the present capacity. Power machinery and other equipment will be installed also at the limestone quarries in the vicinity of the plant. The entire project is reported to cost more than $125,000.

Pittsburgh

PITTSBURGH, April 18.

ALTHOUGH the general machine tool business is quiet, one company the past week booked orders for a gear cutter, a lathe, a gate shear and miscellaneous small tools which totaled a fairly satisfactory volume for the week. Based on the amount of business in outstanding quotations, the future might be viewed with optimism, but purchases are made with such great care from the standpoint of actual need, that it is difficult to make a forecast from the inquiries pending.

The Pittsburgh & West Virginia Railroad Co., Wabash Building, Pittsburgh, has awarded a general contract to the T. J. Foley Co., Fulton Building, for a one-story machine and locomotive repair shop at Carnegie, Pa., to cost in excess of $125,000 with equipment. H. H. Temple is chief engineer.

The Austin Co. Union Trust Building, Pittsburgh, has secured a contract for the construction of a new bolt and nut manufacturing plant at Coraopolis, Pa., for a company whose name is temporarily withheld, to cost more than $60,000 with equipment.

The Island Creek Coal Co., Logan, W. Va., is planning for the construction of two or more tipples at a new town to be established at its mining properties about seven miles from Logan. A power house, water supply system and other structures will be built, including machine shop. The entire project will cost in excess of $1,000,000.

The Pennsylvania Water Co., 712 South Avenue, Pittsburgh, has plans for a new equipment storage and distributing plant and automobile service and garage building, to cost about $65,000 with equipment. Thomas Pringle, Renshaw Building, is architect.

The Monongahela Fuel Co., Fairmont, W. Va., recently organized, has concluded arrangements for the purchase of the properties of the Fairmont & Cleveland Coal Co., and the Fairmont-Chicago Coal Co., at Fairmont and Rivesville, W. Va., and contemplates extensions and improvements, including additional equipment installation. The company is capitalized at $2,500,000 and is headed by W. E. Watson, president and manager, and Carl Riggs, secretary.

The City Council, Parkersburg, W. Va., is said to be planning the installation of pumping machinery and power equipment in connection with proposed extensions and improvements in the municipal waterworks and sewage system, to cost $545,000.

The E. H. Crouch Lumber Co., Beckley, W. Va. has inquiries out for a planer, matcher and other wood-working tools in connection with rebuilding the portion of its mill recently destroyed by fire.

The Board of Education, Pittsburgh, is considering the installation of manual training equipment in a new high school, to cost $500,000, for which it is expected to ask bids on a general contract in June. James T. Steen & Sons, Vandergrift Building, are architects.

J. C. Forster & Son, 2519 Penn Avenue, Pittsburgh, have incorporated as the Forster Mfg. Co. and will continue the manufacture of small stamped steel metal products, kitchen utensils, toys and stamped novelties.

The American Sheet & Tin Plate Co., Frick Building, Pittsburgh, is said to be planning the construction of a one-story addition to its plant at Scottdale, Pa., 80 x 325 ft., to cost about $250,000 with equipment.

St. Louis

ST. LOUIS, April 18.

THE A. P. Green Fire Brick Co., Mexico, Mo., is said to be completing plans for an addition on property acquired several months ago, for the manufacture of fire brick and refractory shapes, to cost more than $200,000 with equipment.

The Southwest Power Co., McAlester, Okla., is disposing of a bond issue of $4,080,000, a portion of the proceeds to be used for extensions and improvements and acquisition of additional properties.

William King and Associates, Inc., 408 Pine Street, St. Louis, has acquired property at Seventh and Morgan Streets, 85 x 127 ft., and is reported to be planning the erection of a six-story automobile service, repair and garage building, to cost in excess of $250,000. William King is president.

The Temple Cotton Oil Co., Ashdown, Ark., is considering rebuilding the portion of its cottonseed oil mill destroyed by fire April 4, with loss reported at close to $35,000 including equipment.

The Board of Education, Ottawa, Kan., contemplates the installation of manual training equipment in its proposed three-story junior high school, to cost $225,000. Washburn & Stookey, Washburn Building, are architects.

The Frick-Reid Supply Co., South Main Street, Tulsa, Okla., manufacturer of oil well and gas equipment, will soon begin the erection of a new two-story plant, 60 x 100 ft., to cost about $35,000 with equipment.

R. H. Sanneman, Lee Building, Kansas City, Mo., architect, has filed plans for the construction of a one-story automobile service, repair and garage building, 115 x 175 ft., to cost about $90,000 with equipment.

The Crane Co., 836 South Michigan Avenue, Chicago, has awarded a general contract to the Mann Co., Cotton Exchange Building, Oklahoma City, Okla., for a two-story and basement factory branch and distributing plant, 80 x 270 ft., Oklahoma City, to cost $125,000 with equipment. Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, are architects.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., is planning for extensions and improvements in its local

power plant in connection with a 1927 expansion program, to include the installation of two 6000-kw. turbo-generators and accessory equipment. A new automatic power substation will be built at Maud, Okla. J. F. Owens is vice-president and general manager.

W. O. Morrow and K. F. Connor, Tulsa, Okla., associated, have plans for a four-story automobile service, repair and garage building, 100 x 145 ft., to cost $150,000 with equipment.

The Perkins Oil Co., Inc., Chelsea, Okla., is planning the installation of additional equipment at its oil refinery to increase the capacity to 80 bbl. per day. E. E. Powell is one of the heads of the company.

The Board of Education, Hutchinson, Kan., contemplates the installation of manual training equipment in a proposed three-story addition to the high school to cost $200,000. W. E. Huise & Co., Stamey Hotel Building, are architects.

The Charles G. Kruckemeyer Machine & Parts Co., 1379 Cockrill Street, Wellston, St. Louis, has been organized to manufacture power transmission machinery, including cut gearing of all types and dimensions and speed reducers. The company will also do plant service work, and is prepared to make special machine parts ranging up to lathe work 36 in. to 52 in. in diameter.

The Union Electric Light & Power Co., St. Louis, has plans for the construction of an addition to its steam-operated electric generating plant, to cost $2,000,000 with equipment.

Philadelphia

PHILADELPHIA, April 18.

CONTRACT has been let by the Union Transfer Co., Broad Street Station, Philadelphia, to F. Jaspersen, 2821 Richmond Street, for a one-story machine shop to cost about $21,000.

The Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, has awarded a general contract to Stewart Brothers, Inc., 2526 North Orkney Street, for a three-story and basement addition, 40 x 92 ft., and one-story extension, 50 x 120 ft., including improvements in present factory, to cost close to $100,000. Rankin & Kellogg, 1805 Walnut Street, are architects.

The William Cramp & Sons Ship & Engine Building Co., Philadelphia, will discontinue shipbuilding operations at its plant at an early date and will use the property given over to this branch to another line of manufacture, including electric machinery production.

Charles Kahn, Morris Building, Philadelphia, and associates plan the construction of a one-story automobile service, repair and garage building at Old York Road and Sixty-ninth Avenue, to cost $100,000 with equipment.

E. E. Beers, trustee in bankruptcy for the Butler Automotive Steel Co., Easton, Pa., manufacturer of motor truck axles, gears, etc., has arranged for the sale of the plant and equipment of the company.

The supply office, Navy Yard, Philadelphia, has been authorized to purchase 2400 assembly turnbuckles in the open market, req. aero. 1554.

The Philadelphia Hardware & Malleable Iron Works, Inc., Ninth and Jefferson Streets, Philadelphia, has plans under way for a new plant at State Road and Rahn Street, comprising a one-story forge and iron shop, 60 x 145 ft.; two-story and basement works and warehouse, 80 x 190 ft., and boiler house, 36 x 40 ft. The entire project is reported to cost more than $125,000 with equipment. The William Steele & Sons Co., 219 North Broad Street, is architect and engineer.

The Pennsylvania Railroad Co., Seventeenth and Filbert Streets, Philadelphia, C. E. Walsh, purchasing agent, is asking bids until April 26 for a quantity of guard rails, frogs, switch points, switches, etc., contracts 46 and 47—1927.

The Philadelphia Interurban Gas & Electric Co., 712 Locust Street, Philadelphia, has plans under way for the erection of a one-story automobile service, repair and garage building, 60 x 150 ft., at Chester, Pa., to cost $65,000.

Fire, April 12, destroyed the plant of the B. F. Sturtevant Co., Camden, N. J., manufacturer of mechanical draft equipment, fan systems, etc., with loss in excess of $150,000 including machinery. Plans for rebuilding are under consideration. Headquarters are at Hyde Park, Boston.

The Norman P. Druck Motor Co., 636 East State Street, Trenton, N. J., has filed plans for a new two-story service, repair and garage building, to cost $85,000 with equipment. J. Osborne Hunt, 219 East Hanover Street, architect.

The Ajax Rubber Co., Breunig Avenue, Trenton, N. J., manufacturer of automobile tires, has arranged for the removal of its general offices and headquarters to the plant at Racine, Wis., which will be extended. J. C. Weston is president.

The Board of Education, Pleasantville, N. J., is considering the installation of manual training equipment in a proposed two-story high school in the Ansley Park section, estimated to cost $500,000, for which plans will be drawn by C. Hudson Vaughn, Guarantee Trust Building, Atlantic City, N. J., architect.

John E. Nitchie, 63 Park Row, New York, architect, has plans for a new six-story automobile service, repair and garage building at Atlantic City, N. J., to cost in excess of $150,000 with equipment.

The Trassioni Metal Co., care of C. R. Trassioni, Darby, Pa., has concluded negotiations for the purchase of the former plant of the Duplex Metallic Co., Conshohocken, Pa., and will make extensions and improvements for the production of steel tanks, drums and kindred products. It is purposed to have the plant ready for service early in June.

The School Board, Marcus Hook, Pa., is said to be planning the installation of manual training equipment in its proposed two-story junior high school to cost in excess of $250,000, for which bids have been asked on a general contract. The Ballinger Co., 105 South Twelfth Street, Philadelphia, is architect and engineer.

Snow Brothers, Butler, Pa., are planning the early construction of a new wood-working plant and planing mill at East Butler, to cost close to $35,000 with equipment. It is purposed to have the plant ready for service early in July.

In connection with its expansion program, the Williamsport Wire Rope Co., Williamsport, Pa., will soon proceed with the erection of a new main production unit, one-story, 200 x 450 ft. The structure, with other new buildings, will be located in what is known as the White Basin district and work on filling in the area, preparatory to building, has been in progress for several weeks. Robert Gilmore is president, and C. M. Ballard, vice-president and general manager.

The School Board, Kulpmont, Pa., contemplates the installation of manual training equipment in a new junior high school on a five-acre tract near the city limits, for which plans have been authorized. It will cost about $130,000 with equipment.

Chicago

CHICAGO, April 18.

GREATER optimism prevails in the machinery trade as the result of an increase in inquiry, although sales are only in fair volume. A 36-in. planer, a 16-in. plunge-cut grinder and five tool-room surface grinders have been purchased by local shops. The Union Pacific has come into the market for several miscellaneous tools and the Chicago, Milwaukee & St. Paul is asking for a 1 x 1-in. single-end punch with 54-in. throat, and a used 16-in. x 10-ft. belt-driven engine lathe.

The Chicago Board of Education is asking for a No. 1 Buffalo motor-driven angle and tee binder. Plans are being prepared for the new Lane Technical High School, Chicago, for which over 100 machine tools will be required. The Western Electric Co. has asked for additional information on an old list. The Santa Fe is inquiring for prices on a Ransom, or equivalent, double dry grinder with 3-in. x 24-in. wheels; a Monarch, or equivalent, 16-in. x 12-ft. heavy-duty engine lathe; a 32-in. Gould & Eberhardt, or equivalent, back-geared crank shaper; and a Barnes, or equivalent, 20-in. heavy-duty sensitive drill press.

The Twin City Treating Co., 239 Thirteenth Avenue, South, Minneapolis, Minn. will open a shop to serve the general commercial trade in carburizing, annealing, tempering and hardening of steel.

The Wagner Malleable Iron Co., Decatur, Ill., has approved plans for a building, 80 x 120-ft., to house its core department.

Myron Spades, 208 South La Salle Street, Chicago, will build a three-story garage, 74 x 130-ft., to cost $120,000.

The Western Electric Co., Chicago, will build an addition, 300 x 400-ft., to cost $400,000.

The Jones & Laughlin Steel Corporation, Pittsburgh Pa., will build a two-story warehouse, 52 x 100-ft., at 2246 West Forty-seventh Street, Chicago, to cost $80,000.

The Clute Mfg. Co., 4824 West Lake Street, Chicago, manufacturer of door checks and builders' hardware, will erect a factory, 47 x 125 ft., to cost $12,000. Plans have been prepared by William Sedic, 1829 Blue Island Avenue.

The Abell-Howe Co., with offices at 53 West Jackson Boulevard, Chicago, has recently moved to a new structural and machine shop at Desplaines Avenue and Van Buren Street, Forest Park, Ill.

The Joseph Turk Mfg. Co., Kankakee, Ill., manufacturer of metal beds, will build two additions 60-ft. x 190-ft. and 80-ft. x 140-ft., which will provide 50,000 sq. ft additional of manufacturing space.

Contract has been let by the National Biscuit Co., 601 Linden Court, Evanston, Ill., for a one-story addition to its machine shop, known as the Evanston Machine Shop, and for a new power plant. The entire project will cost in excess of $100,000 with equipment. R. E. Pingery, 134 South La Salle Street, Chicago, is architect. Headquarters of the company are at 85 Ninth Avenue, New York.

Rebori, Wentworth, Dewey & McCormick, Inc., 332 South Michigan Boulevard, Chicago, architect, has filed plans for a three-story automobile service, repair and garage building, 75 x 130 ft., to cost $125 000.

Mudge & Co., Inc., 80 East Jackson Boulevard, Chicago, manufacturer of railroad equipment and supplies, has awarded a general contract to George Thompson & Sons, 30 North La Salle Street, for a one-story addition to its plant, to cost $40,000 with equipment.

The Interstate Power Co., Crookston Minn., has plans for extensions and improvements in its local steam-operated electric power plant, including the installation of coal-handling and conveying equipment, 400-hp. high pressure boiler unit, modernizing of stoker equipment, etc., reported to cost more than $90,000. The company will also install additional equipment, including condenser apparatus, at its plant at Bemidji, Minn.

The Parco Development Co., Parco Wyo., has authorized the immediate construction of a new brick and tile manufacturing plant, to cost $65,000 with machinery.

The Minnesota & Ontario Paper Co., Minneapolis, Minn., has arranged for a bond issue of $5,000,000, a portion of the proceeds to be used for expansion and improvements. E. W. Backus is president.

The Grinnell Co., 208 South La Salle Street, Chicago, manufacturer of heating equipment, piping, etc., has plans under way for a new two-story pipe fabricating plant, to cost more than $200,000 with equipment. A. Epstein, 2001 West Pershing Road, is architect and engineer. Headquarters of the company are at 260 West Exchange Street, Providence, R. I.

The Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn., has completed plans for the construction of a new steam-operated electric generating plant at Mobridge, S. D., to cost in excess of $90,000 with equipment. Ralph D. Thomas, 1200 Second Avenue, South, Minneapolis, is engineer.

The Chicago, Rock Island & Pacific Railroad Co., 179 West Jackson Boulevard, Chicago, is completing plans for the early construction of a new one-story locomotive repair shop at Silvis, Ill., to cost $125,000 with equipment. C. A. Morse is chief engineer.

Perry E. Crosier, New York Life Building, Minneapolis, Minn., architect, has plans under way for a three-story and basement automobile service, repair and garage building, to cost close to $100,000 including equipment. Bids will be asked in about 60 days.

The City Council, Hibbing, Minn., has rejected bids recently received for an addition to the municipal electric light and power plant, including new equipment, and plans to ask new bids soon. Ralph D. Thomas, 1200 Second Avenue, South, Minneapolis, Minn., is engineer.

The Direct Control Valve Co., 332 South Michigan Boulevard, Chicago, has been incorporated to develop the manufacture of the Lawler patents covering thermostatically controlled valves used in temperature regulation. At present the products are being manufactured under contract, but the company expects to establish its own factory next year.

The plant of the Railway Brake Shoe & Foundry Co., Silvis, Ill., was destroyed by fire on April 7, with loss estimated at $100,000. It had been closed since last summer.

Detroit

DETROIT, April 18.

THE Board of Education, 12541 Second Avenue, Highland Park, Mich., plans the early construction of a two and three-story vocational school, adjoining the present high school, to cost about $120,000. Marcus R. Burrowes and Frank Eurich, Jr., Architects Building, Detroit, are architects.

Following the recent merger of the C. M. Hall Lamp Co., Detroit, with the Edmunds & Jones Corporation, 4440 Lawton Street, same city, manufacturers of automobile headlights and equipment, arrangements have been made for the sale of the plant and property of the Hall company at Kenosha, Wis., and the sale of the Chicago Electric Mfg. Co. and the Canadian Lamp & Stamping Co., both former subsidiaries of the Edmunds & Jones organization. The company will concentrate production at Detroit, using the Hall plant on East Hancock Street and the Lawton Street factory noted. A plant capacity more than double the former combined output will be developed.

Fire, April 11, destroyed a portion of the plant of the Big Rapids Furniture Mfg. Co., Big Rapids, Mich., with loss reported at $70,000 including equipment. It is planned to rebuild. The company is operated by John Martz & Sons.

The Board of Education, Wakefield, Mich., is completing plans for the construction of a one-story manual arts high school, for which an appropriation of $50,000 recently was approved.

The Murray Body Corporation, Russell and Aberle Streets, Detroit, manufacturer of automobile bodies, will discontinue operations permanently at its Racine, Wis., plant, heretofore operated in the name of the H. & M. Body Corporation, and is planning to dispose of a portion of the property.

The Saginaw Furniture Shops, Saginaw, Mich., have acquired the former plant of the Saginaw Cabinet Co. and will remodel for a branch factory.

The City Council, Saginaw, Mich., is asking bids until May 24 for a new pumping plant for the municipal waterworks at Rust Park and the Saginaw River, including complete machinery. Bids will be taken at the same time for a filtration plant. H. H. Eymer, City Hall, is city engineer.

The Federal Mogul Corporation, 11031 Shoemaker Street, Detroit, manufacturer of babbitt metal, etc., has concluded negotiations for the purchase of the property and business of the United States Bearings Co., Indianapolis, and will remove to Detroit, consolidating with its local plant. Lloyd P. Jones is president of the purchasing company, and C. C. Reynolds, treasurer.

The Koestlin Tool & Die Co., 3601 Humboldt Street, Detroit, has plans for a one-story addition, including alterations and improvements in the present plant, to cost in excess of $40,000 with equipment. Janke, Venman & Krecke, 1346 Broadway, are architects

The Michigan Tool Co., 147 Joseph Campau Avenue, Detroit, has purchased the assets and goodwill of the Clark Cutter Co., 1304 Harper Avenue, Detroit, and consolidated the company's business with its own.

The Automatic Control Co., 1980 Woodbridge Street East, Detroit, has been organized to manufacture electric operators, floor trips, limit switches for operators and other electrical control systems. The company will purchase motors, control switches, magnets and will make its own worm shafting, limit switches and structural parts and castings.

The Albion Metal Products Co., 310 Washington Street, Albion, Mich., has been incorporated to manufacture a patented insect and dust screen for use on automobiles. The company is in the market for cold-rolled strip steel, 30-mesh copper wire cloth and special steel shapes.

South Atlantic States

BALTIMORE, April 18.

PLANS are being considered by the Lock Joint Pipe Co., Wilkins Avenue and Millington Lane, Baltimore, for a new one-story plant for the manufacture of reinforced concrete pipe, to cost in excess of $40,000 with equipment. W. P. Grow is general manager.

Ovens, power equipment, conveying and other machinery will be installed in the new plant to be constructed by the Schmidt Baking Co., Hagerstown, Md., to cost in excess of $125,000, for which plans are being prepared by the McCormick Co., 121 South Negley Street, Pittsburgh, architect and engineer.

The Buckeye Cotton Oil Co., Gwynne Building, Cincinnati, a subsidiary of the Procter & Gamble Co., same address, has plans under way for a new cottonseed oil mill at Raleigh, N. C., to cost close to $500,000 with machinery. Robert & Co., Bona Allen Building, Atlanta, Ga., are architects and engineers.

Following the completion of the initial unit at its new steam-operated electric generating plant at the foot of Gould Street, Baltimore, the Consolidated Gas, Electric Light & Power Co., Lexington Building, plans to develop the station in accordance with original survey, and will install additional equipment for a maximum of 213,000 hp. The company has expended about $4,000,000 on the plant up to the present time, and will increase this investment to close to $10,000,000.

The Cardwell Machinery Co., 1900 Cary Street, Richmond, Va., has approved plans for remodeling the two- and three-story buildings, 150 x 155 ft., at Nineteenth and Franklin Streets, for a new plant for the production of labor-saving equipment. George J. Freedley is president.

A. S. J. Atkinson, 3801 Macomb Street, N. W., Washington, architect, is asking bids for a new two-story automobile service, repair and garage building at Georgetown, to cost about $85,000 with equipment.

The Virginia Electric & Power Co., Richmond, Va., is arranging for the early construction of an addition to its steam-operated electric power plant at Norfolk, Va., with installation of additional equipment. The entire project will cost close to $500,000. Stone & Webster, Inc., 49 Federal Street, Boston, is engineer.

The Macon Railway & Light Co., Macon, Ga., is said to be arranging an expansion program, with installation of additional power and auxiliary equipment, line extensions, etc., to cost about $310,000. It will be carried out during 1927.

The Norfolk & Western Railway Co., Roanoke, Va., has plans for the installation of an electrically-operated pumping plant at Richlands, Va., for water supply for local shops. H. P. Wiltsee is chief engineer.

The Verenes Ice Plant & Coal Co., Aiken, S. C., recently formed by Verenes Brothers, has approved plans for a local ice-manufacturing plant to cost about $50,000 with machinery.

The Board of Trustees, Virginia Epileptic Colony, Lynchburg, Va., plans the rebuilding of the machine shop, electric lighting plant, refrigerating plant and mechanical laundry, destroyed by fire April 9, with loss estimated at $65,000 including equipment.

The Clark Air Cooled Motors Co., Norfolk, Va., care of the Industrial Engineering & Sales Corporation, 2208 Connial Avenue, recently organized with a capital of $600,000 and 12,000 shares of stock, no par value, has plans under way for new works consisting of a one-story foundry, 50 x 100 ft.; one-story assembling building, 100 x 200 ft., and two-story office, 25 x 50 ft., for the manufacture of air-cooled automobile engines. The initial works will cost in excess of $100,000 with equipment. C. S. Clark heads the company.

R. A. Houston & Co., Newland, N. C., have inquiries out for a fire-tube boiler, about 150 hp., with accessories; also for a Corliss type engine, 100 hp., with auxiliaries.

The City Council, Waynesboro, Va., plans the installation of pumping equipment in connection with a proposed municipal waterworks, estimated to cost $25,000. Bonds in this amount are being arranged.

The International Power Piston Co., Inc., 4908 York Road, Baltimore, recently organized, is said to be in the market for two or more lathes and other tools. Edward F. Roberts is head.

Milwaukee

MILWAUKEE, April 18.

DEMAND for machine tools still is confined for the most part to single items for replacement needs, but orders are coming from a larger number of shops and the aggregate of new business is increasing. While inquiry is fair, no quotations are asked on large lots of tools. Industrial construction in this locality is of small volume and provides little prospect for volume business. Industrial employment is improving steadily, and official figures show that at the beginning of April more men were employed than a year ago.

Fire in an industrial district on Marion Street in Oshkosh, Wis., on April 13 caused aggregate damage of $125,000 or more. The Wisconsin Iron & Metal Co., 164-178 Marion Street, suffered practically a total loss, with damage estimated at $90,000. The General Foundry Co., 158-160 Marion Street, sustained damage estimated at $10,000, and the Hudson Mfg. Co., barn equipment, 180 Marion Street, about $30,000. Lesser losses were suffered by the Bell Machine Co. and several small concerns. In each instance reconstruction and replacement is planned.

The Hamilton Aero Mfg. Co., 60 Keefe Avenue, Milwaukee, has increased its capitalization from 1000 no-par common shares to 2000 shares in preparation for enlarging its plant for the production of complete airplanes of the all-metal type. Heretofore the company has devoted its attention to the manufacture of propellers. Thomas F. Hamilton is president and chief engineer.

The Gillette Rubber Co., 799 Wisconsin Street, Eau Claire, Wis., manufacturer of tires and mechanical rubber goods, has let the general contract to the Hoeppner-Bartlett Co., local, for the construction of a one-story addition, 82 x 135 ft. A second story may be added during the summer.

The Moloch Foundry & Machine Co., Kaukauna, Wis., suffered estimated damage of $25,000 by fire in its foundry on April 11. Repairs are being rushed, as other departments have been compelled to go on a night shift to fill orders for power hammers, automatic stoking equipment, etc.

The Board of Education, Baraboo, Wis., was authorized at the municipal election to issue $250,000 bonds for the construction and equipment of a new high school which is to include a complete manual training institute.

The Board of Public Works, Wauwatosa, Milwaukee County, Wis., is asking bids until April 29 on furnishing and installing a 1000-gal. deep well turbine centrifugal pumping unit for a new artesian well. Bids also will be received on any other satisfactory type of pump or air lift and compressor with engine or squirrel cage type electric motor. A. V. Brigham is secretary of the board.

The Wisconsin Iron & Wire Works, 1660 Booth Street, Milwaukee, will let contracts shortly for the construction of second-story additions to the pattern shop, 40 x 60 ft., to the drafting room, 40 ft. sq., and the office building, 40 x 60 ft. With equipment and machinery the work will cost about $35,000.

The Milwaukee Electric Tool Corporation, Milwaukee, has been incorporated to manufacture electrically-driven tools, machinery, appliances, etc., in an existing plant at Forty-fifth and Rogers Streets. The identity of the principals is withheld for the present. The incorporators are Waldemar C. Wehe and associated attorneys, 123 Wisconsin Avenue, Milwaukee.

The LeRoi Co., 660 Sixtieth Avenue, West Allis, Milwaukee, which is erecting several plant additions to accommodate the operation of the recently acquired Beaver Mfg. Co., Milwaukee, is in the market for six 1½-ton electric traveling cranes. An order for one 5-ton crane has been placed with the Milwaukee Electric Crane & Mfg. Corporation.

The Peterson & Janssen Cutting Die Co., 1210 Third Street, Milwaukee, has increased its capital stock from $5,000 to $10,000 and will enlarge its plant and production.

Gulf States

BIRMINGHAM, April 18.

CONTRACT has been let by the San Antonio Portland Cement Co., Lakeview Avenue, San Antonio, Tex., to the Vogel Co., for a two-story addition to its mill at Cementville, 80 x 200 ft., to cost $90,000. The W. E. Simpson Co., National Bank Building, is engineer.

The West Florida Power Co., Tallahassee, Fla., has plans for a hydroelectric generating plant on the Ockloknee River, near Jackson Bluff, to cost $2,000,000 with transmission system. A power dam will be built. The project will require about 24 months for completion. Armes & Winthrop, Tallahassee, are engineers.

The Board of Education, Abilene, Tex., contemplates the installation of manual training equipment in a proposed addition to the high school to cost about $160,000, for which plans will be drawn by the David S. Castle Co., Alexander Building, architects.

The McWane Cast Iron Pipe Co., 3700 North Eleventh Street, Birmingham, has filed plans for two additions, each one story, 40 x 120 ft., and 45 x 165 ft., to cost in excess of $25,000.

The Southern Ice & Storage Co., Houston, Tex., plans the erection of a new ice-manufacturing plant with an initial output of 75 tons per day, to cost $160,000 with machinery.

The General Garage & Repairing Machine Shop, McAllen, Tex., is planning the early establishment of three new branch machine and repair shops, each to cost more than $25,000 with equipment. Purchases of tools and machinery will be made soon.

E. W. Napier, Harlingen, Tex., and associates, are planning the construction of a new ice-manufacturing and cold storage plant at Weslaco, Tex., to cost approximately $100,000 with machinery.

The Texas & Pacific Railroad Co., Fort Worth, Tex., is planning the construction of an engine house and locomotive repair shop on local site, in connection with a new terminal project. A fund of $2,000,000 is being arranged.

The Magnolia Gas Co., Mineola, Tex., has begun the construction of a new gas compressor station for handling natural gas through a pipe line from Latex, La., to Dallas, Tex., to be located on property about three miles from Mineola, where 75 acres recently was purchased. The entire project, with equipment, will cost more than $750,000.

The Eureka Foundry Co., 406 South Sixty-eighth Street, Gadsden, Ala., is considering the installation of a monorail conveying system and other equipment at its plant.

N. D. Cobb, Merkel, Tex., is planning the purchase of electrically-operated pumping machinery for a local installation.

The Borough Council, Leland, Miss., has approved a bond issue for extensions and improvements in the municipal electric light and power plant, including the installation of additional equipment. Swanson & McGraw, Inc., Balter Building, New Orleans, La., is engineer.

The Southern Ice & Utilities Co., Dallas, Tex., has plans

for a new ice-manufacturing plant at Odessa, Tex. It will be electrically-operated.

R. E. Ludwig, director of public utilities, St. Petersburg, Fla., has plans under way for a new municipal waterworks, taking a supply from Mirror and Crescent Lakes, to include the construction of a pipe line, installation of pumping and power equipment, filtration plant, etc. The entire project is estimated to cost in excess of $500,000.

The Pecos Valley Utilities Co., Artesia, N. M., operated by the Kansas City Light & Power Co., Kansas City, Mo., has plans for the construction of a new hydroelectric generating station on the Pecos River, near Girvin, Tex., with transmission system to total close to 100 miles for service in the oilfields in this territory. The entire project is reported to cost more than $400,000 with equipment.

The supply office, Naval Station, Pensacola, Fla., has been authorized to purchase four hoists in the open market. It is expected to ask bids at once.

The Gulf Concrete Pipe Co., Brownsville, Tex., is said to be planning the construction of a new plant for the manufacture of reinforced concrete pipe, to cost in excess of $60,000 with equipment. N. A. Epps heads the company.

The Port Realty Co., Port Arthur, Tex., is planning the purchase of a band saw, cut-off saw, surfacer and other woodworking tools and equipment for installation in a local plant. The company is developing homesites and constructing dwellings in this section.

The United States Heat-Treating Co., San Antonio, Tex., has been organized to manufacture fish tail bits used for drilling wells with the hydraulic rotary process. The company purchases fine steel in 8-in. and 6-in. square billets and is also in the market for pyrometers, impact machines and photomicrographic apparatus.

Cincinnati

CINCINNATI, April 18.

A SLIGHT improvement in machine tool sales was noted the past week, and several leading builders report that fresh business booked during the first half of April exceeded that in the corresponding period in March. Conditions, however, are spotty, some plants having a fairly good number of orders on hand and others finding buyers extremely reluctant to close for equipment. In consideration of the amount of business for which inquiries have been issued, the railroads are expected to be important factors in the market during the next two months. Purchases of tools by the automotive industry have been negligible, and no sizable jobs from that source are pending.

Demand for lathes is below normal for this time of year. Sales of planers and boring mills have increased considerably since April 1, while activities in upright and radial drills are only moderate. Milling machines are moving fairly well. Bookings of grinders have been heavy, and purchases of shapers have improved. The turret lathe market is somewhat sluggish, although a betterment is anticipated before the end of the month.

The Superior Pattern Co., 14 West McMicken Avenue, Cincinnati, manufacturer of metal and wood patterns, has awarded a general contract to the Austin Co. for a new two-story plant to cost $25,000.

The Tennessee Electric Power Co., Chattanooga, Tenn., has made application for permission to issue bonds for $2,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system in connection with a 1927 expansion program.

Officials of the Tennessee Extract Co., Centennial Building, Nashville, Tenn., are said to have plans for the early construction of a new paper mill, comprising a multi-story unit to cost in excess of $400,000 with machinery. It is purposed to have the mill ready for service in about 12 months.

The Herbert-Fischer Brick Co., Memphis, Tenn., is planning the purchase of a Diesel engine for installation in the power house at its plant at Slidell, La.

The International Harvester Co., 608 South Michigan Avenue, Chicago, has leased a two-story building, 150 x 150 ft., to be constructed at Eastmoreland Street and Pauline Avenue, Memphis, Tenn., for a new motor truck service, repair and garage building, to cost about $85,000 with equipment. W. C. Lester, Dermon Building, is architect.

Plans are nearing completion for a one-story power house at the new meat-packing factory of the E. Kuhn Sons Co., Cincinnati, including power equipment, pumping machinery, compressors, etc. It will cost about $50,000 with equipment. Carl J. Kiefer, Schmidt Building, is consulting engineer.

The United Public Utilities Co., Dayton, Ohio, operating plants and system between Dayton and Winchester, Ind., is disposing of a bond issue of $5,550,000, a portion of the proceeds to be used for extensions and improvements, including installation of additional equipment.

The American Hardwood Co., Glenmary, Tenn., is considering the early rebuilding of the portion of its plant destroyed by fire April 5, with loss estimated in excess of $200,000 with equipment.

The Board of Education, Louisville, plans the installation of manual training equipment in a proposed junior high school to cost $500,000, for which bids will soon be asked on a general contract. J. M. Colley, Louisville, is architect.

William F. Davis, 501 Leath Street, Memphis, Tenn., engineer, has inquiries out for electric generating sets, Diesel type engines, 18 and 24-kva. capacity.

Cleveland

CLEVELAND, April 18.

MACHINE tool sales show little change. The volume of orders continues light and is running about the same as during March, although manufacturers of turret lathes report some gain in business over last month. Sales are confined almost wholly to single tools from scattered sources, largely for replacement. Little plant extension work is under way. Railroads in this territory have bought virtually no equipment this year and no business of any size is in prospect from that source.

The John Harsh Bronze & Foundry Co., 1627 West 117th Street, Cleveland, has placed a contract with the Boldt Construction Co. for a factory addition.

The Ohio Bell Telephone Co., Cleveland, has acquired from the National Malleable & Steel Castings Co. a 4-acre site on Woodland Avenue and the Belt Line Railroad, on which it will erect a five-story, 100 x 200-ft. warehouse and manufacturing plant. It will be used for warehouse purposes and for a service station and garage by the Ohio Bell Co., and as a manufacturing plant for the Western Electric Co. The estimated cost is $700,000.

The Ferro Enamel Supply Co., Cleveland, has closed its warehouse at 422 Frankfort Street, Cleveland, and is making an addition to its plant at Clinton, Mich.

The Cleveland district offices of the Combustion Engineering Corporation, the Ladd Water Tube Boiler Co. and the Heine Boiler Co. have been consolidated and will be located at 1107 Guardian Building, that city. Frank Henderson is Cleveland district manager for the three companies.

The Akron Cut Stone Co., Akron, Ohio, has acquired a tract of 1½ acres near the Upson Road, as a site for a new one-story plant, 50 x 300 ft., for sawing, planing and finishing limestone and sandstone products. The machinery installation will cost approximately $50,000.

The A. W. Reiser Mfg. Co., 119 Ontario Street, Toledo, Ohio, manufacturer of electric lighting fixtures, etc., will rebuild the portion of its plant recently destroyed by fire, with loss reported at $40,000 including equipment.

The Gottion Brothers Co., Fremont, Ohio, is planning the construction of a new stone crushing plant, to cost approximately $100,000 including machinery.

The Berger Mfg. Co., Canton, Ohio, manufacturer of sheet metal products, will rebuild the portion of its plant destroyed by fire, April 12, with loss reported at more than $400,000 including equipment. The company is operated by the Central Alloy Steel Corporation, Canton.

Indiana

INDIANAPOLIS, April 18.

BIDS will soon be asked by the Fries Tool & Machine Works, Horton Building, Fort Wayne, Ind., for a new one-story plant, 40 x 142 ft., to cost about $40,000 with equipment. Guy Mahurin, Standard Building, is architect.

The Millspaugh & Irish Corporation, Indianapolis, manufacturer of automobile bus bodies, etc., is arranging to use about 250,000 sq. ft. of floor space in the former plant of the Midwest Engine Co., recently acquired, and will lease other space at the plant, which totals 28 buildings in all. Among the local interests which are considering the leasing of space and removal to this location are the Utilitor Co., manufacturer of tractors, and the Battery Separator Co.

The Delco-Remy Corporation, Anderson, Ind., manufacturer of automobile starting and lighting systems, a division of the General Motors Corporation, Detroit, is completing plans for a one-story addition, 240 x 400 ft., to cost in excess

of $400,000 with equipment. C. E. Wilson is general manager.

The Central Parking Garage Co., Indianapolis, affiliated with the Kentucky-Maryland Realty Co., same city, has awarded a general contract to the A. V. Stackhouse Co., Indianapolis, for a six-story automobile service, repair and garage building, 75 x 142 ft., to cost about $190,000 with equipment. William F. Kernodle, Frankfort, Ind., heads both organizations.

The Hopson Tire Co., 217 Vine Street, Evansville, Ind., is considering the construction of a new two-story service, distributing and storage building, to cost close to $100,000 with equipment.

The Noble Township Board of Education, Logansport, Ind., care of William G. Rammel, 204 Fourth Street, Logansport, architect, plans the installation of manual training equipment in a proposed new high and grade school at Noble Township, Cass County, to cost about $90,000, for which bids will be asked soon.

The Anderson Engine & Foundry Co., 215 Jackson Street, Anderson, Ind., is completing plans for an addition to its power house, 30 x 50 ft., reported to cost about $25,000 with equipment.

Fire, April 12, destroyed a portion of the plant of the Sutton-Garten Co., 425 North Capitol Avenue, Indianapolis, operating a general welding works, with loss estimated at close to $21,000 with equipment.

The Cleveland Grain & Milling Co., Board of Trade Building, Indianapolis, is completing plans for a new grain elevator at Beech Grove, near the city, with conveying, elevating, screening and other equipment, estimated to cost $125,000. James Stewart, Inc., 343 South Dearborn Street, Chicago, is engineer.

Pacific Coast

SAN FRANCISCO, April 13.

THE Valley Concrete Pipe & Products Co., Yuba City, Cal., has closed negotiations for the purchase of a 3½-acre tract at Richmond, Cal., as a site for a new plant for the production of concrete pipe and other cast concrete products, to cost about $75,000 with equipment.

The Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of commercial oxygen, acetylene, etc., has arranged for the purchase of the plant of the Industrial Chemical Co., Phoenix, Ariz., and will establish a new works at this location. Extensions and improvements are planned.

The Valley Ice & Laundry Co., Hermet, Cal., has completed plans for a one-story cold storage and refrigerating plant, to cost close to $40,000 with equipment.

The General Electric Co., 5441 East Fourteenth Street, Oakland, Cal., has awarded a general contract to the Foundation Co., Kohl Building, San Francisco, for a one-story addition, 75 x 200 ft., to cost in excess of $75,000.

Officials of the Bloedel-Donovan Lumber Mills, Bellingham, Wash., are contemplating the construction of a new pulp and paper mill, with main unit about 150 x 700 ft., to give employment to about 300 men. The entire project is reported to cost approximately $3,500,000. The Bloedel company is now operating a local lumber plant.

Ovens, power equipment, conveying and other machinery will be installed in the plant, 100 x 200 ft., to be constructed on Blimp Street, Los Angeles, by the Four S Baking Co., 1119 West Twenty-fifth Street, to cost about $150,000. The company will also build at this location a one-story automobile service, repair and garage building for company cars. Herbert S. Heineman, 2608 South Figueroa Street, is architect.

The Helwig Iron Works, Almaden Avenue, San Jose, Cal., will soon begin work on a one-story machine shop, to cost approximately $25,000 with equipment. C. W. McKenzie, Bank of San Jose Building, is architect.

The City Council, Astoria, Ore., plans the installation of pumping machinery and power equipment in connection with extensions in the municipal waterworks, using the Youngs River as a source of supply. The entire project will cost about $250,000.

The Monolith Portland Cement Co., 215 West Seventh Street, Los Angeles, has acquired property at Laramie, Wyo., as a site for a new cement mill, reported to cost more than $600,000 with machinery. It will include a power house and machine shop. The company has organized a subsidiary under the name of the Monolith Portland Cement Midwest Co. to carry out the project.

The Holbrook, Merrill & Stetson Co., Eighteenth and R Streets, Sacramento, sheet metal products, plumbing equipment, etc., has plans under way for a one-story addition, to cost about $30,000.

The Board of Education, Riverside, Cal., will build a one-story vocational shop in connection with a proposed new junior high school, for which bids have been asked on general contract. It will cost in excess of $250,000 with equipment. Austin & Ashley, Chamber of Commerce Building, Los Angeles, and W. Horace Austin, Long Beach, are architects.

The Pacific Rolling Mill Co., San Francisco, has moved its Los Angeles office from the Chamber of Commerce Building to 416 Board of Trade Building. John L. Brickels, sales manager for southern California, is in charge.

The Vernon Foundry, manufacturer of cast-iron and brass products, formerly at Los Angeles, is now located at Hollydale, Cal.

The Seattle Marine Equipment Co., located for several years at 744 North Thirty-fourth Street, Seattle, has removed to 70 Marion Street. It is Seattle distributer of Caille outboard motors, Kermath, Miller and Niagara marine motors, Mianus Diesel motors and general marine electrical equipment.

The Pittsburgh Meter Co., East Pittsburgh, Pa., maker of water, gas and other types of meters, has opened sales offices at 715 Tenth Avenue, Seattle.

Canada

TORONTO, April 18.

WHILE machine tool sales for the week were confined chiefly to units of one or two, inquiries are more numerous, many coming from new plants now under construction. The automotive industry, including garages and repair plants, has been steady a buyer of late, but orders have been mostly for single tools on replacement account. Canadian railroads are buying more extensively for shop needs and inquiries are appearing regularly. The improvement in industrial activities has been reflected in a better demand for small tools from many districts of the Dominion.

Announcement has been made by Hon. William Finlayson, Toronto, Provincial Minister of Lands and Forests in Ontario, that the Government had reached an agreement with the Caledonia Hardwood Products Co., Ltd., whereby British capital to the extent of $1,167,000 will be invested in the development of the hardwood industry along the north shore of Georgian Bay. The contract stipulates that the company shall erect a sawmill with a minimum capacity of 15,000,000 ft. of hardwood per year, and to cost at least $250,000. A railroad 30 miles long will also be built to cost with equipment, $600,000. Other structures in connection with the project will also be erected.

The Canadian Pacific Railway Co. has awarded the general contract to Carter-Halls-Aldinger Co., Ltd., Winnipeg, for the erection of a machine shop at Kenora, Ont.

Plans are being prepared by C. C. Lessard, 32 Allies Boulevard, Quebec, for a waterpower plant to cost $60,000 for Princeville, Que.

The U. S. L. Battery Co., Welland Avenue, Niagara Falls, Ont., is making arrangements for an addition to its plant.

The L. & P. Mfg. Co., Niagara Falls, Ont., proposes to build an addition to its foundry.

Plans are being prepared by the Montague Electric Co., Montague, P. E. I., for the erection of a power plant to cost $20,000. J. Poole is engineer.

The Nova Scotia Power Commission, Halifax, N. S., is planning an extension to the power plant at St. Margaret's Bay, to cost $650,000. A. T. Croft is secretary.

The Aux Chiens River Power Co., Ste. Anne de Beaupre, Que., contemplates the construction of a power plant to cost $65,000. C. Camille Lessard, 32 Allies Boulevard, Que., is engineer.

Western Canada

The Sidney Roofing & Paper Co., Victoria, B. C., has started excavation work for the new pulp and paper mill to be erected on the old Songhees Reserve. Robert Mayhew is manager of the company.

C. F. Pretty, who controls the Kitimat Timber Co., Vancouver, B. C., is arranging for the financing and construction of a pulp and paper mill to have a capacity of 250 tons per day and cost several million dollars. The proposed mill will be erected in the Kitimat Valley, and construction work will start at an early date.

The City Council, Edmonton, Alta., will call for tenders at an early date for the construction of a new sediment basin and water softening plant. The general contract will represent an expenditure of $60,000, and $20,000 additional will be spent on machinery and equipment. D. Mitchell is commissioner.

The Kootenay Pulp & Paper Co., Ltd., 508 Wood Street, Nelson, B. C., contemplates erecting a large mill on the Canadian Pacific Railway flats at Nelson.

Foreign

BIDS are being asked by the Port Commission, Santiago, Chile, until June 8, for a suction dredge, as per specifications on file at the office of the Chilean Consulate, 280 Broadway, New York.

The Victoria State Electricity Commission, Melbourne, Australia, will take bids soon for a steam turbo-generator and auxiliary equipment. Specifications on file at the office of the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington.

The Tyrol Hydro-Electric Power Co., Innsbruck, State of Tyrol, Austria, is disposing of a bond issue of $3,000,000 in the United States, a considerable portion of the proceeds to be used in connection with a hydroelectric power development in the Tyrol district, the largest of its character in Austria, with ultimate capacity of close to 120,000 hp. The intial installation of 54,700 hp. is scheduled for completion next fall. Dr. Anton Eder is president.

The Japan Nitrogen Fertilizer Co., Naoetsu, Niigata, Japan, has plans under way for a new plant for the production of lime nitrogen for fertilizer service. The project is reported to cost in excess of $200,000 with machinery.

A new company has been formed at Piedras Negras, Mexico, to construct and operate an electric light and power plant, for which plans will soon be drawn. A transmission system will be built. The entire project will cost approximately $200,000. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Mexico No. 240702. The American Consulate at Piedras Negras, Oscar C. Harper, vice-consul, also has information.

The Supermarine Aviation Works, Ltd., recently formed with a capital of £300,000, will succeed to the plant and business of the company of similar name at Woolston, Southampton, England, and plans to expand the works.

A company has been formed at Port Elizabeth, Cape of Good Hope, South Africa, to construct and operate a cement mill on site near the city. The initial plant is reported to cost in excess of $1,000,000 and will be designed to give employment to close to 600 men. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference South Africa No. 239347; also, at the office of the American Consulate, Port Elizabeth, C. H. Hall, Jr., vice-consul.

NEW TRADE PUBLICATIONS

Magnolia Metal Bearings.—Magnolia Metal Co., 75 West Street, New York. Pocket-size handbook of 96 pages devoted to selection and preparation of bearing metals for various kinds of service. Sketches of bearings with indicated arrangement of bearing metals are given.

Furnace Lining.—Plibrico Jointless Firebrick Co., 1800 Kingsbury Street, Chicago. Catalog of 36 pages entitled "Cutting Furnace Costs" and telling about plastic plibrico furnace lining—a jointless refractory. Illustrations are numerous, including special forms of furnaces, steel anchors to hold the material in place, special shapes for tuyeres or other openings in furnaces, etc. Instructions for installing are complete, covering seven pages.

Metal Stampings.—Bossert Corporation, Utica, N. Y. Catalog of 20 pages dealing with stampings for a wide variety of purposes, large and small stampings of varying weights being turned out. Illustrations show a large number of uses, including parts for automobiles, air compressors, automatic refrigerators, meters, wheels, washing machines, steel bottles and a wide variety of other products.

Magnet Wire Dereeler.—P. E. Chapman Electrical Works, St. Louis, Mo. Bulletin No. 35, ten pages, describing the general construction and operation of the company's compensating pensionless magnet wire dereeler which is intended for dereeling all sizes of fine wires on spools 6 in. in diameter or less. It is claimed that drag at starting and over-running at stopping of the spool, with the consequent tangling of wire and friction, are eliminated, and that therefore there is no stretching or breaking of the wire.

Electric Motors.—Master Electric Co., Dayton, Ohio. Folder, form No. 358, giving data relating to the performance of the company's product. Use of these motors on machines of various types is illustrated.

Screw Conveyors and Bag Holders.—Webster Mfg. Co., 1856 North Kostner Avenue, Chicago. Two folders, one giving price list and specifications of screw conveyors with flights cut from plate steel, including both standard and extra heavy weights. The other describes the Mosher adjustable bag holder, with side support with both round and square jaws.

Marine Oil Engines.—Cummins Engine Co., Columbus, Ind. Catalog of 12 pages illustrating and describing Diesel engine for motorboats. A standardized unit has been developed, with uniform cylinders fitted into engines of 1, 2, 3, 4 and 6 cylinders and rated from 12½ to 75 hp. at 600 r.p.m. The engines are recommended for boats upward of 30 ft. in length and 7 ft. in beam.

Metal Stampings.—Crosby Co., Buffalo. Booklet of 12 pages showing some 25 intricate stampings made by the company during 1926. Illustrations are large and a feature of the booklet is the absence of reading matter which is confined to a brief explanatory note on the second page.

Calendar.—Sheet Steel Trade Extension Committee, 715 Oliver Bldg., Pittsburgh. Poster section, 14 x 19 in., pictures and describes the beauty, permanence and safety of garages of sheet steel. The pictures are in color. The calendar section is 5 x 13 in., in red, black and white. The garage fire-test of a two-car sheet steel garage, made by the United States Bureau of Standards, is briefly described and illustrated.

Materials Handling.—Revolvator Co., 336 Garfield Avenue, Jersey City, N. J. Bulletin 90-G treating of telescopic model revolvators, adjustable to any desired height from 7½ ft. to 18 ft.

Blow-off Valves.—Riley Power Equipment Co., 49 East Wells Street, Milwaukee. Leaflet describing the Eckenroth automatic reseating blow-off valve, designed particularly for severe types of service.

Drill Chucks.—Union Mfg. Co., New Britain, Conn. Small illustrated folder providing brief description of the special features of the company's New Britain drill chuck.

Electrical Equipment.—General Electric Co., Schenectady, N. Y. Bulletin GEA-588 devoted to gears for centrifugal compressors. Full information regarding the design, manufacture and service expected from the types of gears is included.

Pyrometers.—Wilson Maeulen Co., Inc., New York. A 4-page leaflet describes the company's automatic temperature control pyrometers for industrial furnaces.

Steel Castings.—Lebanon Steel Foundry, Lebanon, Pa. Two leaflets, one No. 14 on "Pouring" and another on "Real Economy," well illustrated, supplement other similar leaflets published lately.

Electric Recording Gages.—Brown Instrument Co., Philadelphia. Catalog No. 75 describes a complete line of indicating, recording, signalling and controlling pressure gages, manufactured by the company. The catalog is a revision of a former edition, and features all types of round case instruments, and in addition, single-record, duplex-record, multiple-record and multiple-duplex-record models of strip chart pressure recorders. In addition to pessure and vacuum gages the catalog includes illustrations and descriptions of Brown draft gages. A thoroughly revised chart list, including strip charts, is presented.

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